The Iron Age

A Review of the Hardware and Metal Trades.

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Whittle's Process for the Manufacture of Wrought Nails.

In manufacturing nails singly by the hot process—which are commonly known as wrought nails—by machinery, very many difficulties have from time to time presented themselves, and numbers of patents have been obtained, and vast sums of money expended by different individuals in their endeavors to overcome them. Still the great obstacle to be overcome—viz., the wear and tear of tools caused by the softening of the steel which follows on being brought into contact with the intense heat from the iron of which the nails are being made—remained. It thus becomes an expensive matter to keep the machinery in an efficient working state, as skilled machinists and tool makers must be employed for the purpose, commanding good wages. This difficulty Mr. Whittle, of Harborne, near Birmingham, the inventor of the machinery we illustrate, claims to have at length overcome by the arrangement of mechanism herewith shown, and although he has now made many tons of nails, and turned out more than double the quantity in a given time that he ever made by any previous arrangement of machinery, not 1/, he states, has been expended in wear and tear of tools. The iron from which the nails are made is in the form of flat bars, the width depending upon the number of nails intended to be made at once; the present machines are making ten 4 in. nails at one operation, although twenty, or thirty, or almost any number may be made at once, providing the machinery be of sufficient strength. Some five or six bars of about 6 ft. in length are inserted through openings in the front of a furnace, and when brought to a white heat for about 2 ft. of its length, one of them is taken to a rolling machine, the end of the bar being inserted between a pair of eccentric rolls, and pushed forward to an adjustable stop placed at such a distance behind the rolls as to cause them to give a suitable amount of taper to the end of the bar, corresponding to the taper of the nails to be made; so soon as the rolls seize hold of the iron it is forced back in the direction of the workman, thus the end only is tapered; a length of the bar corresponding to the length of the nails to be made therefrom is now cut off by the action of a pair of shear blades. The separated piece or wedge shaped blank then falls down an iron incline or spout, and is passed to a slitting machine, when it is dropped between a set of slitting soils mounted on strong spindles, and driven by wheel gearing and a swiftly revolving fly-wheel. The piece of hot iron being now seized by these steel jaws is instantly swallowed down out of sight; but soon a shower of separated nail blanks or headless nails is seen to rush down another iron spout placed below the machine, where they soon accumulate on the floor in a glowing heap, and become thoroughly annealed by their own heat. After each piece has been rolled out and cut off, the heated bar is again inserted between the tapering rolls, and the same operation is repeated until the heated part is worked off, when it is again returned to the furnace and a fresh bar taken out, and the process is repeated with such rapidity that three hundred 4 in. nail blanks can thus be forged in the space of forty minutes. When the nail blanks are cold, they are conveyed to the shaking room, where they are shaken in a barrel for the space of about five minutes, to free them from scale adhering to them; they are then carried to the heading machine. Here they are placed by the hands of children in a series of holes in the periphery of a revolving disc, which is moved round by an alternating motion; each blank is thus brought between a pair of gripping dies which holds securely whilst being headed, by the action of a powerful bolt worked to and fro by a crank, and driven by a heavy fly-wheel and strong gearing. As the disc revolves, the nails drop from the machine also down an iron spout, from whence they are removed to the baggage and store room.

The nails thus made are of excellent quality, the process of manufacture materially improving the toughness of the iron; they will stand the test of bending, clinching, or twisting, equal to the hand-made nails, and are suitable for driving into any kind of wood, whether hard or soft, although they can be sold at little more than the price of cut nails, which are only suitable for very soft wood.

Fig. 1 is an end elevation partly in section, and Fig. 2 a front elevation in section of the machine for slitting the wedge-shaped plates of iron into nail blanks.

a, *a* are the slitting rolls; *b*, *b* guides for guiding and straightening the nail blanks after they pass from the rolls; *c*, a central guide, or separator, forming an acute angled space with the guides, *b*, *b*, into which the slit blanks are forced by the action of the slitting rolls, and are thereby straightened before leaving the machine. The guides, *b*, *b*, oscillate on the axis, b^2 b^2, carried by the bars, *d*, working in the frame of the machine; similar bars, *f*, *f*, are also arranged across the bottom of the guides, *b*, *b*, the whole series being braced together by the vertical rods, *g*, *g*; the blanks are liberated from the machine by raising the hand lever, *k*, which causes the tappets, *h*, *h*, to act on the bars, *f*, *f*, thereby opening the guides, *b*, *b*, sufficiently apart to allow the nail blanks to fall from the machine. The guides, *b*, *b*, are pressed together by strong springs.

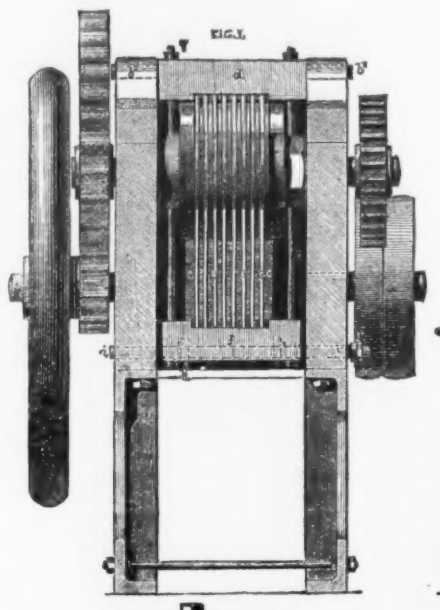

FIG. 1.

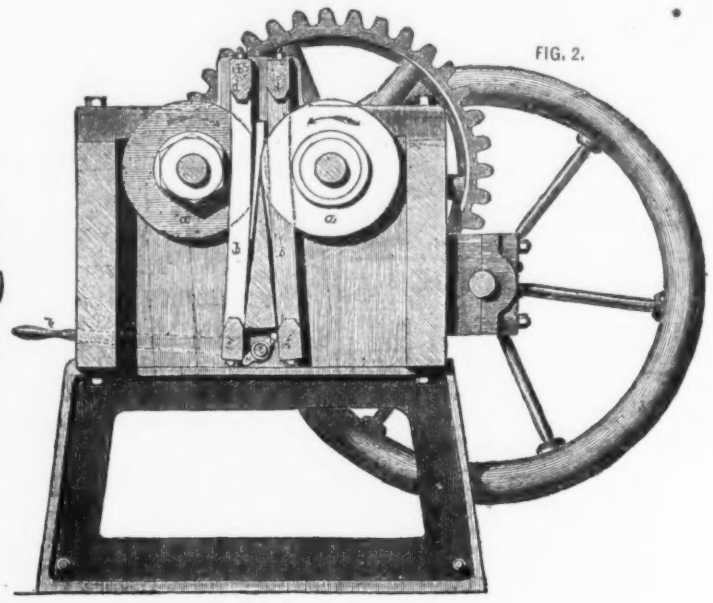

FIG. 2.

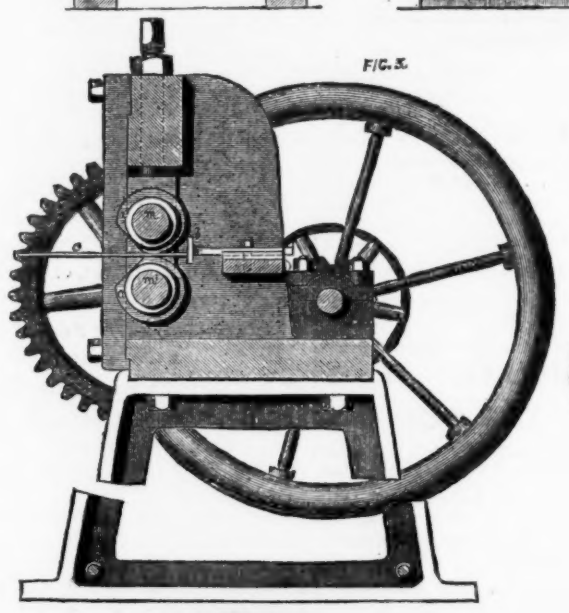

FIG. 3.

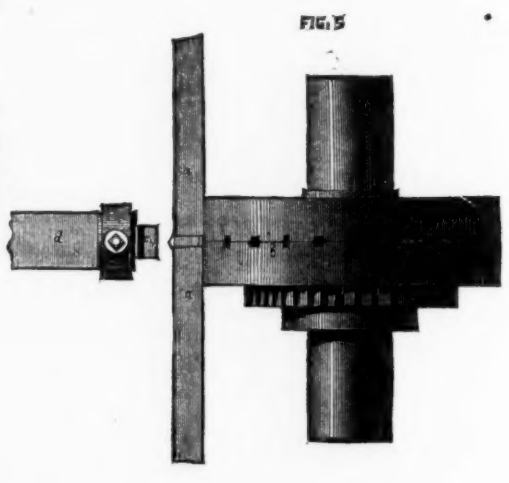

FIG. 5

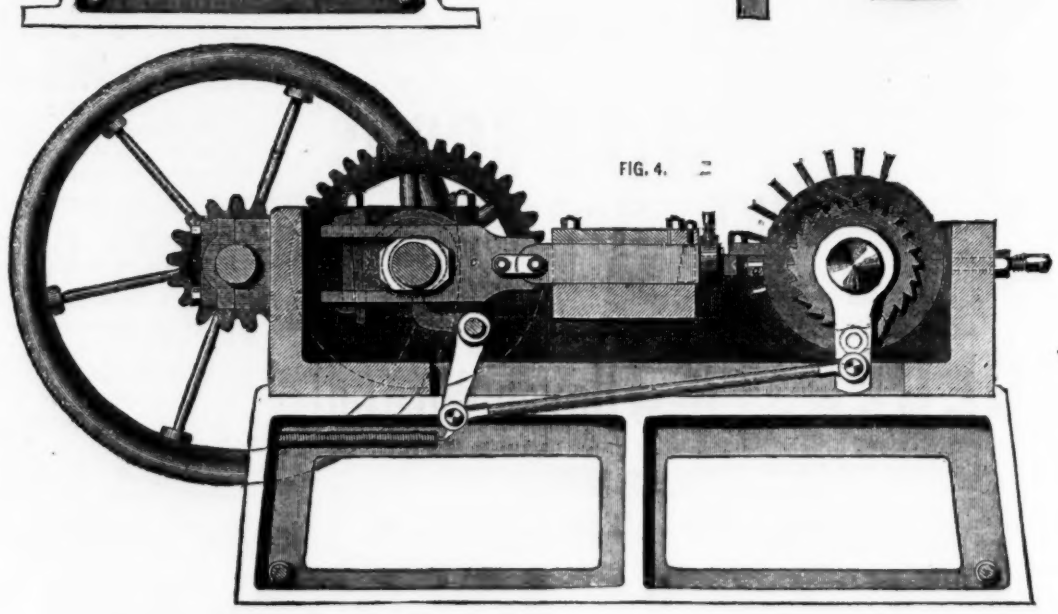

FIG. 4.

MACHINERY FOR MAKING HOT WROUGHT NAILS.

Fig. 3 is an elevation in section of a pointing machine. *a*, *a*, are the pressing or tapering rolls, *m m* are the bearings or spindles, *b* is a stop against which the heated bar is pushed by the workman when inserted between the opening in the rolls. The heated bar is placed by the workman in the space formed by the junction of the rolls and lightly pushed forward in the direction of the adjustable stop *b*, as shown in the drawing. By the rotation of the rolls, they being eccentric, on the faces, the bars will be tapered to a point and delivered back to the workman.

Fig. 4 is a longitudinal section of a heading machine; in this machine the nail blanks are fed into the machine by hand in a cold state. The blanks are brought successively between a pair of hard steel gripping tools *a*, *a*, by the alternating action of the revolving disc *b*, and headed by the tool *c*, actuated by the sliding bolt *d*, worked by a crank motion and the connecting rod *e*. After the nails have been headed, they fall from the openings in the disc as they approach the lower side by their own gravity.

Fig. 5 shows a plan of the disc, together with a portion of the heading and punching tools. The general action of this machine will be readily understood by the drawings.—*Engineer.*

Iron Making in Belgium.

We condense the following from a paper by Mons. A. Habets, read before the Iron and Steel Institute, at Liege:

The production of pig iron in Belgium amounted, in 1871, to 610,000 tons, while the quantity of native iron ore used did not exceed 100,000 tons, the rest of the ore required, nearly 600,000 tons, being furnished principally from the oolitic iron ores, which are worked in the Grand Duchy of Luxembourg. This consumption, therefore, represents more than one-third of the total production of the pig iron of Belgium. Although situated on the same geological level, the iron ore does not exactly occupy the same geological position as does the main ironstone deposits of Cleveland. It is placed on the level as a marly sandstone, and corresponds more nearly to the top seam of the Cleveland district. Most of the French geologists call it the upper part of the lias, whereas Belgian and German geologists place it generally on the basis of the inferior oolitic, in the Bathoman system of M. d'Omalius. There are two ores in the Duchy of Luxembourg. One is an alluvial ore, of which the production reached nearly 50,000 tons last year, while the other, called the "minette," amounted to 1,000,000 tons. Some works preserve the prejudice that the alluvial ores contain good qualities, and they add homeopathic ores as a fluxing material, but at present this prejudice is being rapidly removed. In 1842 the blast furnaces of La Providence employed this ore, but the extensive consumption of it dates from 1862, which is the period of transformation of the old charcoal furnaces of the Duchy into the large coke furnaces. The first blast furnaces erected specially for the employment of coke as a fuel produced from 15 to 30 tons per day. The whole formation may be divided into five groups: (1) Nancy; (2) Metz; (3) Grand Duchy of Luxembourg; (4) Longwy; (5) Halauzy Musson (Belgium). The ore is a hydrate of iron, mixed more or less with a silicate of iron, and called limestone marl. The average quantity of metallic iron contained in it is 33 per cent. The production of phosphorus found in it is rather considerable. Some of it is very calcareous, and some very silicious, while there are other parts containing both calcareous and silicious seams. The ore costs on the average 3f. per ton at the furnace, and the carriage of coke from Liege, as the center, costs 8f. 5c. per ton; for the reason that the state has bought up the Great Luxembourg Railway. This is caused also by a duty of 1f. 30c. per ton. The blast furnaces of Luxembourg are in a more favorable position, as they are very near the works, and there is therefore very little to pay for carriage. The ton of ore costs about 2f. The carriage of coke from Liege to Esch actually costs nearly 7f. 75c., which, however, will be reduced to 6f. 90c. in a very short time. The circumstance of the iron ore deposit covering the point of intersection of four different nationalities, gives rise to most interesting studies of national economy. The law of 1810 is still in existence in France, as well as in Germany. In France, however, the law of the 9th May, 1866, has annulled the law of 1810 so far as regards the distinction to be made between the mines to be worked by the proprietors and the surface and mines that are to be conceded by the State. Since 1829 it has been the practice in France not to grant any concession to iron ore deposits, but to reserve the right of the surface proprietor, who can work the mine on the day level system under the eye of the mining authorities as long as he can make proof. If the hight of the cutting has not any regard to richness it may come to this—that the proprietor will work the area before the proprietor can use the right given to him by the state. In Belgium the case has been decided differently by the law of 1837, which has reversed the commission on iron mines. The same law at present exists, so that the iron ore mines are not conceded in reality in Belgium. The small deposit of the Musson Halauzy belongs for the most part to the commune, which, as the proprietor, has a right to work the deposit or concede it to other parties, these parties paying the commune a royalty on the minimum of the annual production. The same condition is met with in the Grand Duchy of Luxembourg. These different laws affect very materially the economical conditions of the productions. In Belgium the royalty is 25c. to 30c. per ton in favor of the proprietor of the surface. In France the concession is a gratuity, and there is very little remaining at the disposal of the proprietors of the surface. In Alsace and Lorraine, also, the concession will be a gratuity, while in Luxembourg it can only be obtained at a very high price, and that price can only be justified by the high rates of iron that have been current during the last few months. The question of commercial legislation has thus placed an obstacle in the way of the full development of the natural resources of the country, and the examples that have been given prove that even free trade is not sufficient to give to a country the full benefit of its resources, and also that it will be difficult to come to any agreement on the subject of mining legislation. The cost of the ore in Luxembourg varies generally from 1f. 50c. to 2f. at the mine, and the actual selling price is about 5f. per ton free on trucks.

If the results of a recent competition for the supply of steel rails to the Belgian government may be taken as a fair test, it certainly appears that the English iron industry is beaten on the Continent. The quantity required in this instance was 12,000 tons. The order was secured by Messrs. Schneider, the celebrated engineers and iron masters, of Le Creuzot, France, who are naturally well pleased at having vanquished both Belgian and English competitors. The following were the firms who tendered on this occasion, the first named giving in the lowest tender; the rest are stated in the order in which they approached the low terms of the accepted candidate: Messrs. Schneider & Co., of Le Creuzot; Messrs. Tiden, Nordenfelt & Co., of London; the Ebbw Vale Company; the Cockerill Company; Messrs. Adhewar, Le Roy & Co., of St. Jean; Messrs. Brown, Bailey & Dixon, of Sheffield; Mr. Fowler, of Brussels; the Angleur Steel Works Company, Liege; and the Schlessin Company, Liege. The lowest tender was £18. 2/ 6 per ton, and the highest (that of the Schlessin Company) was £19. 2/ per ton. Both in France and Belgium the iron trade appears to be, for the moment, in a state of quietude similar to that prevailing in England. In France, new blast furnaces are being erected, and the import of pig iron is on the increase, the official figures for the first five months of this year (the last published) showing an augmentation of 10¾ per cent. as compared with last year. On the other hand, the imports of manufactured iron had diminished five cent. The exports of iron from France showed a reduction during the first five months of 1873 of 10¼ per cent., compared with the same period last year; but in May there was a very decided increase. All these indications appear to show that, at least as regards the iron trade, France is not likely to be left behind in the European industrial race.

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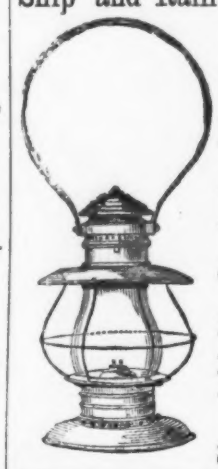

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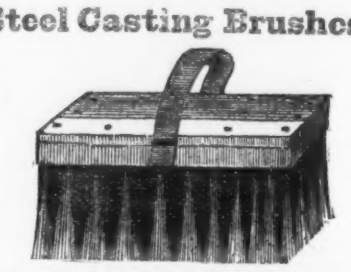

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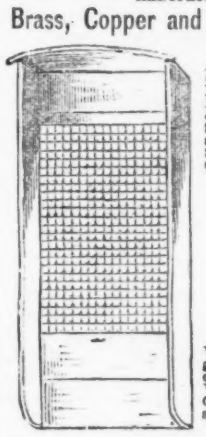

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IRON WIRE,

Bright, Coppered, Annealed and Tin Plated.

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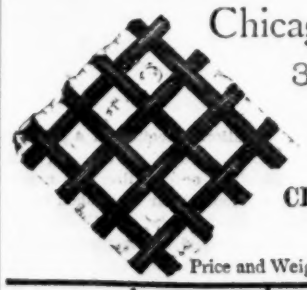
GUN SCREW WIRE

of all sizes up to one half inch in diameter, straightened and cut to order. Special attention is giving to finishing orders to sample for particular purposes, where exactness of size is required. ☞ We work only the best Brands of Norway and Swedes Iron.



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No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.
10	3.47	40	11	3.20	38	12	2.80	35	14	2.43	33	16	2.00	30	18	1.39	30
11	2.75	32	12	2.45	31	13	2.15	30	15	1.97	30	17	1.47	25	19	1.08	25
12	2.10	26	13	1.85	25	14	1.62	25	16	1.51	25	18	1.11	20	20	0.76	20
13	1.61	22	14	1.41	20	15	1.31	21	17	1.10	20	19	0.85	18			

These Cloths are used for Mines, Jail, Asylum, and Storehouse Window and Door Guards, Malt Floors, Bulkheads and Floors for Grain Elevators and Grain Vessels. SPECIAL FIGURES FOR LARGE ORDERS.

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A. B. 14,	Bustle,
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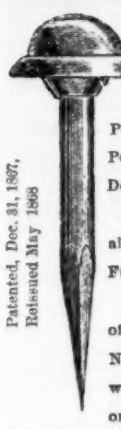

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Manufacturers of Richards' Patent Porcelain-head Picture Nails; also, Porcelain Picture, Drawer, Shutter, and Door Knobs, etc., etc.

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We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders.

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Illustrated Catalogues sent on application.

Protect Your Buildings.

Which may be done with less than quarter the usual expense, by the use of

GLINE'S PATENT

Slate Roofing Paint.

A roof may be covered with a very cheap shingle, and by the application of this Slate be made to last from **25** to **30** years. Old roofs can be patched and coated and made to look much better and last longer than new shingles without the slate, for

One-Third the Cost of Re-Shingling.

The cost of slating new shingles is only about the cost of simply laying them, and the Slate is FIREPROOF against sparks and live coals falling upon it, as may be easily tested by any one, and as appears from the fact that Insurance Companies **make the same Tariff that they do for Slated Roofs.**

For tin and iron it has no equal, as it expands by heat and contracts by cold, and NEVER CRACKS or scales. For cemetery fences it is particularly adapted, as it will not corrode in the most exposed places. Roofs covered with Tar Sheathing Felt can be made water tight at a small expense.

The Slate or Paint is **EXTREMELY CHEAP!** Two gallons will cover a hundred square feet of shingle roof, or over four hundred of tin or iron. Price of the Slate ready for use is **80** cents per gallon, **$16** per half barrel, or **$30** per barrel of about **40** gallons, with a liberal discount to the trade. We furnish and apply the material for **$2·50** per **100** square feet, in the vicinity of New York.

We use no Tar in this Composition, therefore it does not affect the water of the roof, if turned off for the first one of two rains.

The Paint has a very heavy body, but is easily applied with a 4 or 6 inch coloring brush.

On old rotten shingles it fills up the holes and pores, hardens them, and gives a new and substantial roof that will last for years. On curled or warped shingles it brings them to their place and keeps them there. It fills up the holes in Tin or Felting Roofs, and stops the leaks; one coat is equal to ten of ordinary paint.

The color of the Slate when first applied is of a dark purple, and in about a month it changes to a light uniform slate color.

And is to all Intents and Purposes Slate.

It is a slow dryer, but rain will not affect it in the least in one hour after it is put on.

Samples sent to any part of the country by Express, C. O. D., at the following prices: If ordered to be sent by freight, the money must accompany the order.

1 Gallon and Can	$1 50
2 Gallons and Can	2 25
5 Gallons and Keg	5 50
10 Gallons and Keg	9 50
15 Gallons and Keg	13 50
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40 Gallons and One Barrel	30 00

Roofs examined, estimates of cost given, and when required will be put in thorough repair. Orders respectfully solicited.

Agents wanted in every town.

For full information, recommends from Insurance Companies and others, Editorials from the leading Newspapers, or a sample Shingle coated with the Slate, address,

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MARKLAND'S PATENT ALL WOOD BOTTOM

COAL HOD,

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These Hods are far superior to the old style of *All Iron* Hod, as the bottom and foot is made of *one piece* of *light and tough wood*, which will not *rust, split, break*, or become *ragged* in the foot or rim, like the old style, and there is not the *least* danger of punching holes through or knocking the bottom out.

With ordinary care, we will guarantee the **GALVANIZED All Wood Bottom Hod** to last five years. Have known them to last seven years, and still remain in use.

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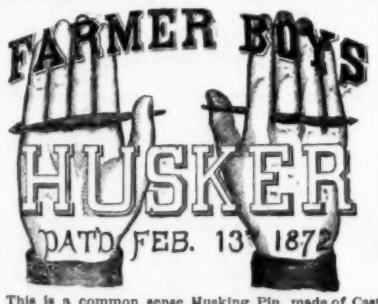

This is a common sense Husking Pin, made of Cast Steel or Malleable Iron, secured to the hand in a new and an improved manner, making it the best Husker in the market. Price List and Circular free. Address

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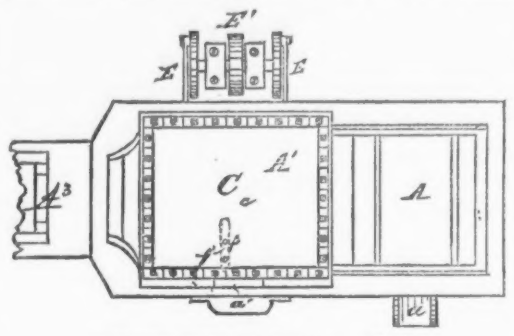
New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN PUDDLING FURNACES.

Specification forming part of Letters Patent No. 140,140, dated June 24, 1873, issued to Charles Jones, of St. Louis, Mo.

The improvements here presented relate: First, in providing the bottom or cooling device with water-cups to act as receivers of water and exhausters of steam, the latter cooling the upper part of bottom and protecting same from oxidation. Second, to the peculiar combination, with smelting chamber, of bottom having water-cups and, relatively arranged therewith, water-boshes to facilitate the operation of cooling the bottom and protecting the sides and top



IMPROVED PUDDLING FURNACE.—*Fig.* 1.

of same from the effects of oxidation. Thirdly, to the peculiar manner of supporting the bottom on lines of rollers set in bearings, and the connection to power-source of said bottom, so as to impart to same an oscillating motion. Fourthly, to certain detail construction of parts, all of which will now more fully appear.

Of the drawing, Figure 1 is a top plan with roof removed; Fig. 2, a longitudinal sectional elevation; Fig. 3, a transverse sectional elevation.

A is the grate or furnace; *a*, the fire-hole or grate door. Next to grate is smelting chamber A_1; a_1, its door to charge. A^2 are the bearings or brick support; a^2, air openings or chambers between bearings; A^3, chimney. In the smelting chamber, and between the outer end of bearings A^2, are the respective water receivers B B'. (See Fig. 2.) Each water bosh or receiver B B' is fed with water in any usual way, the object being to store water in said water-boshes for purpose of effecting the cooling operation. The interior of the smelting chamber and top of bearings A^2 has a concave form, to adapt said parts to support and conform to my improved bottom. C represents movable cast iron bottom. This is formed of a concave shape, and consists of an upper and lower or true and false

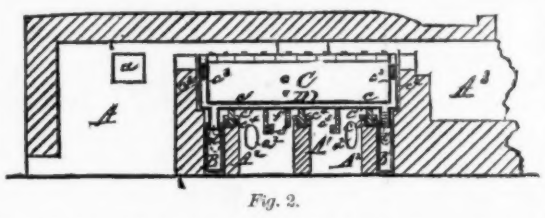


Fig. 2.

bottoms, c c_1, with sides c^2 c^3. (See Figs. 2 and 3.) The flanges of the top edges of the bottoms c c^1 are properly joined, and otherwise there is bolted over top edges fire-brick for protection from oxidation; thus forming a cooling chamber, D. Forming part of the bottom c^1, and communicating with chamber D, are water-cups, d d', that of d having its opening reversely positioned to that of d'. (See Fig. 2.)

The arrangement and operation of the bottom C, to achieve a continuous agitating and working action of the smelting mass, are as follows: The bottom C is supported on a line of rollers, c^4, respectively set in each bearing A^2 below, as shown in Figs. 2 and 3. With the rollers as its bearing, and by virtue of its concave form, the bottom C is to be oscillated. Hence, the bottom (forming part of its false bottom c^1) has arms c^5, to which are coupled the side pitmen E. These, in turn, extend outwardly to connect to a suitable crank or cam attachment, E^1, to which the motive power is applied. From power-source there is thus imparted to the bottom C proper the required oscillating motion to accomplish the stirring, working, and mixing action (usually done by hand). By the motion or action of the bottom C the water-cup *d* raises a measured quantity of water on the lower bottom c^1, which water,

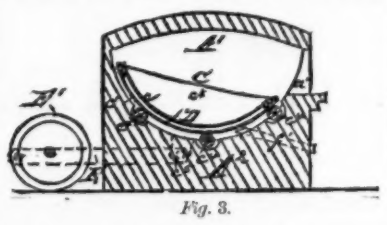


Fig. 3.

being evaporated to steam, cools the upper bottom *c* less than the under one. Also, it will be noticed that each reverse motion of bottom C causes one of the water-cups to act as a receiver, the other as an exhauster. The cooling process here achieved is most equally distributed under the bottom part *c*, and, further, the steam escaping around and above or over causes a more regular, uniform, and better draft. In the bottom C a pot is fixed in the usual way with crushed or broken ore, scrap, &c. As soon as the metal or pig melts the bottom C is started to have a continuous and active operation. While this operation continues the operator can readily examine the condition of the pot (its contents) through the door, and thus add all necessary (cinder and water) for mixing and thickening at any period. The cinder or overflow occurring flows or passes off at tap-hole *f*, Fig. 1, into cinder spout *f'*, at regular intervals, till the iron comes to nature. At this stage, the bottom, if necessary, can be stopped, and the process of balling by hand, if small blooms are required, can be done as ordinary, or said bottom can be continued to run, and the balling operation can be done by cutting or separating the young blooms till the required size is obtained. The simplicity of operation, cheapness of construction, and various advantages of my said improvements are readily apparent.

Claim.—1. The water-cups *d d'*, acting as receivers and exhausters, in combination with chamber D.

2. In combination with smelting chamber of furnace, the bottom C having water-cups *d d'*, and, arranged relatively therewith, the water-boshes B B'.

3. The combination of the bottom C, rollers c^4, arms c^5, side pitmen E, and crank attachment E'.

IMPROVEMENT IN THE MANUFACTURE OF STEEL.

Specification forming part of of Letters Patent No. 139,751, dated June 10, 1873, issued to John Absterdam, of New York.

This invention consists in a bar, plate, sheet, or slab, of semi-steel of cementation, produced by subjecting unrefined wrought iron bars, puddled bars, scrap bars, muck bars or rough flats of old rails to a process of cementation, and then refining the metal by welding the same together into a merchantable article, in such a manner that a product is obtained which can be manufactured cheap, and combines certain properties of steel with other properties of iron, whereby the same is rendered fit for a great many manufacturing purposes. Also, in a railway bar made of wrought iron and semisteel of cementation, produced by subjecting the crude unrefined iron to a process of cementation, and finishing the metal after cementation into a head-bar by welding under the hammer or by the action of rolls, then welding the said head-bar to rail-pile in finishing the whole into a merchantable railway bar.

In carrying out this invention, puddled bars, muck bars, unrefined scrap bars, or rough flats of old rails cut in suitable lengths, according to the pile or fagot to be made, are subjected to the process of cementation. By this process crude converted bars or crude blistered steel are obtained. From these crude converted bars piles or fagots are formed, corresponding to the bars or plates to be produced, and by introducing these piles or fagots into a suitable furnace they are so heated that they can be welded and rolled into merchantable bars, plates, sheets, or slabs. By subjecting the piles or fagots to the welding and rolling process the metal is refined after conversion, and the product obtained is a semi-steel of cementation, which combines certain properties of steel with other properties of iron. The piling or fagoting, heating and rolling, is done in the iron rolling mills, by the same rolls and in the same manner usually employed in rolling iron bars, plates, sheets, or slabs, with the exception that a small quantity of flux may be used between the bars in the pile to insure a more uniform structure of metal.

The bars or slabs of semi-steel of cementation, obtained as above described, can be used with particular advantage for making semi-steel headed railway bars. In manufacturing such railway bars, pile cemented bars of crude iron, sprinkling a small quantity of flux between such bars. Then heat and roll the pile into a head-bar of the requisite thickness, sawing the same in pieces of the required length while the metal is yet hot, the length being measured according to the weight of the rails to be produced. The piling, heating and rolling is done as now practiced in iron rail mills in making iron head-bars for iron rails. Having thus produced a head-bar of semi-steel of cementation, place the same on the pile-carriage, the side to be united to the iron upward, and place the iron bars thereon, finishing the rail pile as now practiced in piling iron for making iron rails, with the exception that they are sprinkled on the surface of the head bar to be welded with a small quantity of flux. The pile is passed through the same rolls which are generally used in rolling iron rails. But in order to thoroughly cleanse out the scale or oxide from between the head-bar of converted metal and the iron bars of the rail-pile, introduce between the same some suitable flux.

The advantages of the invention will be apparent from the following observations: In the manufacture of ordinary steel of cementation refined bar iron is always used for conversion into blistered steel, and the very best iron is selected for this purpose. Crude or unrefined iron bars may be used, and by converting them a crude semi-blistered steel is produced. By piling or fagoting the crude converted bars, and by heating and welding them either under the hammer or by means of rolls, the metal undergoes the operation of refining, after it has been cemented, and the product obtained is only a semi-steel of cementation, since the metal retains the properties of iron with some qualities of steel, which is owing to the conversion of the iron before it is refined, and the refining of the metal after it is converted.

Claim—1. A bar, plate, sheet, or slab of semi-steel of cementation, produced by subjecting the crude unrefined iron to a process of cementation, and then refining the converted crude iron by heating and welding the same under the hammer or by the action of rolls.

2. A railway bar, made of wrought iron and semi-steel of cementation, produced by subjecting the crude unrefined iron to a process of cementation, and finishing the metal after cementation, substantially as set forth.

IMPROVEMENT IN THE MANUFACTURE OF SPIEGELEISEN.

Specification forming part of Letters Patent No. 139,649, dated June 10, 1873, issued to Edward Baker, of Millstone, New Jersey.

That quality of iron known as spiegeleisen has heretofore been produced in the United States from the residuum of the zinc ore of Sussex county, New Jersey, containing Franklinite, after the ore has been treated for the production of white oxide of zinc. by analysis the said residuum containing, on the average—

Oxide of zinc	6·40
Oxide of manganese	17·70
Peroxide of iron	39·90
Lime	8·74
Magnesia	5·50
Silicon	21·65
	99·89

Such residuum has for some years past been successfully worked in a smelting furnace, such as described in Letters Patent granted to Thaddeus Sillick, and bearing date the 13th day of January, 1855, to which is applied an apparatus for collecting the remaining zinc, or portions of it, and the production of spiegeleisen thus obtained from such residuum has been, on the average, about 27 per cent. of the weight of the residuum treated.

By the admixture of iron ore, such as hematite, or other iron ores with the said residuum, it is possible to materially increase the yield of spiegeleisen of a quality equally good with that heretofore obtained from the residuum alone.

The improved process is worked in the proportions of one-eighth iron ore to seven-eighths residuum, and in that proportion, the iron ore being magnetite, may be obtained an average of thirty-five per cent. of spiegeleisen to the weight of residuum and ore, and the product thus obtained, on analysis, contained, on the average:

Metallic iron	85·40
Metallic manganese	10·22
Carbon	4·10
Phosphorus	·39
Silicon	·10
Total	100·11

By this improved process of smelting the residuum of the zinc ore containing Franklinite iron in admixture with any of the ordinary iron ores spiegeleisen is produced at a much cheaper rate than by any process heretofore known and practiced.

Claim.—The process for obtaining spiegeleisen by smelting the residuum of the zinc or like ores which contain Franklinite iron in admixture with ordinary iron ore, substantially as described.

A Mammoth Ferryboat.—On the 10th inst. Mr. Henry Steers launched from his shipyard, at Greenpoint, one of the largest ferryboats ever built in this country. The new boat is built for the New Jersey Southern Railroad Company, to run across the Delaware River and connect with the Baltimore and Ohio Railroad, and although intended for freight principally, has tracks laid upon her deck for the transport of passenger cars, of which she can take twenty-two on board at one time, a greater number than has ever been transported on any ferryboat heretofore. The new boat is named the Charles J. Osborn, after the secretary of the company, and is 264 feet in length on deck, 40 feet in width across the hull, but the guards extend out 12 feet on either side, making a width of 64 feet over all. Her depth is 12 feet. She was commenced on the 15th of May, and has been very thoroughly built. Her keel is of white oak, with floor timbers of the same material, and very heavy. Her top timbers are of hackmatack and cedar. Across her frame diagonally she is iron strapped, giving her great additional strength. Her deck-beams are of yellow and white pine, with a white pine deck 3 by 5 inches. Her joiner work will be of the best description, and she will have, in addition to the usual side cabins on deck, a saloon and restaurant above these, beside a private saloon for ladies. She is to have a beam engine, with 50 inch cylinder and 12 feet stroke; a horizontal tubular boiler, 12 feet 6 inches in diameter and 31 feet long. She will draw, all complete, only about 5 feet 6 inches of water, and will steam about twelve knots per hour. The launch was a very beautiful one. There were not many people to witness it, only a few officials of the company and a few friends of the builder. The new boat was so flat on her bottom that but little wedging was necessary, the ways being simply laid under her floor, and the keel-blocks being removed she came fairly down upon them. At about noon the last shore was knocked away and the boat was free to move, requiring only a slight force to start her. This was given by a pair of jack-screws, and away she slid down into the water without the least strain or jar. Notwithstanding her immense weight, she sat upon the water as light as a cork, her great bearing giving her a wonderful buoyancy, and she evidently is adapted to the carrying of a tremendous weight without displacing much water. Her cost is about $130,000.

Prices of Coal.—The committees representing the Coal Operators' and Miners' Association have made the following report:

The following parties having been drawn on September 1 to furnish prices of coal sold by them in August, upon which to base rates of wages to be paid in the month of September, report the following as the average of their sales for all sizes, excepting pea coal, at Port Carbon:

Oakdale Coal and Mining Company	No report.
S. M. Heaton & Co., Cuyler Colliery	$3 37·01
Wm. Penn Colliery	2 59·00
R. Heckscher & Co., Kohinoor Colliery	2 63·75
Boston Run Colliery (P. & R. C. & I. Co.)	2 64·00

The average of these prices being $2 60·94, the rate of wages to be paid in September, 1873, will be four per cent. over the $2·50 basis.

B. E. TROUTMAN,
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Iron.

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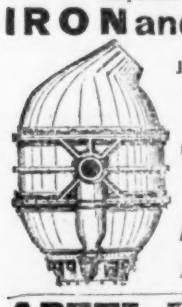
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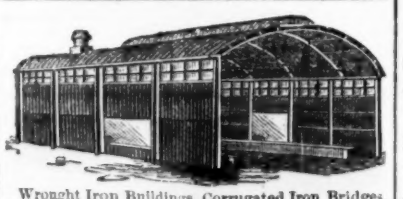
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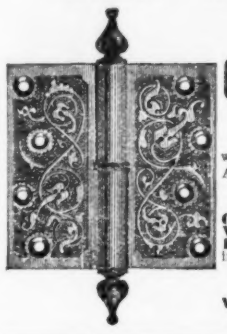

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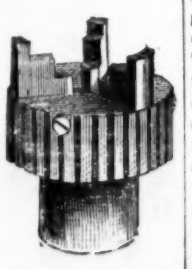

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Ilsenburg Art Castings.

A writer in *Engineering*, describing the art castings exhibited at Vienna from Count Stalberg Wernigerode's iron foundry, at Ilsenburg, Hartz, says:

The Ilsenburg Iron Works are amongst the oldest in Germany, and the iron foundry there is most probably one of the earliest in the world. In ancient documents written in the fifteenth century, pots, plates, balls, etc., cast at Ilsenburg, are mentioned; while cast iron plates which have been collected on the spot for some time past afford additional evidence on this point. The director of the Ilsenburg Foundry, Oberhutten Inspector Schott, has collected and arranged these plates in his official residence, and the collection possesses much interest, not only from an historical, but also from an artistic point of view. All these plates have served as stove plates, and almost all are marked with a date, the earliest being that of the year 1509. The subjects on the plates are chiefly taken from the history of the Bible, and the ornaments consist of busts, tournaments and allegorical pictures. The latter begin with the commencement of the seventeenth century. Some of the older plates are very beautiful, and the whole collection proves in the best possible manner the great perfection and the high position German art must have occupied in the sixteenth century, how it declined gradually during the Thirty Years' War, and how it finally died out utterly during the eighteenth century.

If the earlier time shows, however, the most originality—for instance, Judith in the tent of Holofernes, surrounded by guns and gabions—the design of the figures, dresses, etc., is nevertheless so satisfactory from an artistic point of view, that the pattern makers of that time who had carved the models, some of which are still at the stores of the foundry, must have been men well skilled in their art, and must have attained a degree of perfection which has never been since reached. But the success did not rest with the skill shown in the pattern, the molder using the pattern evidently participated in it, otherwise such fine castings could not have been produced.

With the decline of skill in making the patterns, the taste naturally became corrupted, and the molding less and less perfect, until eventually it lost all artistic value; even in the beginning of the present century the art of molding was still in a very primitive state. When the taste for artistic design began to revive, the hands, still rough and unskillful, were led to better and higher-class productions, which elevated the taste. When the appreciation of elegant forms shall have become general, then, and only then, we shall have in all branches of industry products equal to those of the sixteenth century, and the debased taste, now too common, will gradually disappear.

The necessity of extending art to all departments of industry occured, nearly forty years ago, to Mr. Schott, who was at that time engaged on the Brunswick Works, the Carlshutte and the Wilhelmshutte, both works being still famed for the excellency of their foundry productions. He is now, and has been for thirty-five years, the managing director of the Ilsenberg Foundry, and from the first he sought to cultivate art in the productions of the works. The results of his exertions in this direction are shown by the exhibits of castings of works of art in the German annexe for art and industry at the Vienna Exhibition.

The Ilsenburg Foundry exhibits at the Vienna Exhibition art castings which represent chiefly objects of the Roman period, of the Middle Ages, of the Renaissance period, and generally of such well known works produced by master-hands as are most suitable for reproduction in iron. They are worthy of all prase for clearness of the castings, and especially for the beauty of form. They are not only suitable for decorative purposes, but they are very instructive.

It is unfortunately but too true that the want of appreciation has caused numerous works of art to be destroyed. Even in the first half of this century it has happened that ancient church vessels have been sold by the authorities for the value of the metal for remelting. Such vandalism, however, is now no longer possible, and objects of art are sought for and carefully preserved. How much art education has progressed in this direction has been fully proved by the many collections which have been made during the last few years. With refinement of taste increasing demands are made on precision and correctness of execution, and public taste has become greatly refined. Imitations and reproductions of antique works of art are no longer accepted as the simple copy of the outer forms, but an execution is demanded which should exactly represent the original in the smallest detail.

In consequence of the scrupulous exactness with which the old masters executed their work, and which did not admit of neglect, even in the smallest and least important detail, great difficulties are met with in the reproduction of such works of art—difficulties which are especially great in iron castings, on account of the impossibility of the parts being united by soldering. But, notwithstanding these disadvantages, the problem has been solved, and that in such a manner that iron castings may be substituted for electrotype productions, combining, as they do, greater strength with equal fineness, and, being cheaper, they should certainly be preferred. These are results which have been achieved through continued exertions with the view of cultivating pure art in the production of iron castings, and it is very desirable that these exertions should be continued by future iron founders.

With regard to the process of production, it may be observed that the two main points upon which the casting of iron depends are the molding sand and the metal. About 300 or 400 years ago the conditions for preparing the sand required for casting upon the open hearth must have been known. It must even then have been recognized that the molding sand should allow the penetration of the expanding gases, which are produced by the high temperature when the fluid metal is poured into the molds. Otherwise the fine castings already referred to could not have been produced. This condition of the molding sand was far better understood in this remote period than at a later time, when an empiric preparation of the sand was considered to be sufficient, and by which means progress in the art of casting was necessarily hindered. When the question had to be decided as to what was to be done to improve the sand, especially for the production of sharp and fine castings, it is probable that a greater degree of fineness was tried. Unfortunately, this condition of great fineness, which is decidedly necessary for sharpness in the castings, was accompanied by the disadvantage that the fluid metal, when poured into the mold, did not remain undisturbed, but destroyed the work of the molder. The problem was to find an explanation for these occurrences, and an acquaintance with the principles of the open hearth doubtless led to the conclusion that the want of penetrability produced by the great fineness of the sand caused this disadvantage. Nature rarely supplies a molding sand which possesses both fineness and penetrability, and the general scarcity of such a sand, which induced many important iron founders to obtain it at great expense from distant places, naturally led to artificial productions being tried.

Of the various kinds of molding sand at the disposal of the Ilsenburg Foundry, one is found in the neighborhood, in the diluvial formation, this sand consisting of a mixture of fat loam with coarse grains of quartz. It is used only for the molding of large pieces, and the molds made of it can be employed only after having been dried at a high temperature. A rather finer variety of this sand serves, when mixed with other sand, for the larger class castings; but in this case, also, it is necessary that the prepared parts of the molds should be dried or heated in order that by the evaporation of the water there may be produced a contraction of the proportion of clay which the sand contains, and that thus there may be formed the minute channels which are necessary for the escape of the gases and steam generated at the high temperature of the fluid iron.

In the chalk formation, which fills the large and, in some places, deep basin adjoining the mountains of the Harzer district, there are found in the neighborhood of Ilsenburg, upon the chalky marl, strata of loam mixed more or less with grains of quartz of different degrees of fineness; the penetrability, and thus the utility of the molding sand depending upon this admixture. In a few exceptional places there is found a molding sand that could almost be used in its natural state; the quantities thus obtained, however, are very small, and are not in proportion with the increasing demand of the Ilsenburg Foundry. If, therefore, the artificial preparation of the molding sand had not been successfully introduced, the necessary supply could only have been obtained from distant sources at great expense.

After having recognized the penetrability of the sand for steam and gas as the chief characteristic necessary, it became next an important matter to determine the signs of this required penetrability existing, and for this purpose the following process has been adopted: A known peculiarity of a sand which allows of a casting being made in it without the mold being artificially dried, is, that if the molder moistens the mold with water, the sand possesses the surprising quality of absorbing the water without altering the mold. The molder can thus, when working with the so-called green sand, employ water according to his requirements, in order to strengthen the sharp corners, edges, and ribs of the molds, for which purpose water may be dropped upon the latter by means of a brush. The water disappears, and is absorbed without doing any damage to the mold. This quality of the sand has been used at Ilsenburg in the following manner for determining the penetrability of the material. After various mixtures of sand have been prepared, and after it has been ascertained that sharp and distinct impressions can be taken with the materials, equal-sized balls or cubes are formed by compressing the sand in the hand, and that to such an extent that a slight further compression is just possible; this is easily done with a little practice, as this manipulation forms an important factor in ascertaining the quality of the sand for all molders, and determines the degree of moisture to be given to the molding sand for casting in a green state. The balls of sand thus prepared, and made of uniform size, are then weighed, and water is next poured upon them as long as it is absorbed. When absorption no longer takes place, and the water appears to remain on the surface of the sand, the balls are weighed again. Supposing the different samples to be equally good, as far as the power of producing sharp impressions (as previously ascertained) is concerned, then that sample which is capable of absorbing the largest amount of water will offer the greatest facility for the escape of the gases and steam.*

It was in 1844, when, by the kind recommendation of the director of the Ecole des Mines, at Paris, M. La Play, the Professor Gaultie de Chaubri obtained for several professional men admission to some of the foundries of Paris. Excellent molding sand was to be found there, and the qualities which it possessed, necessary for the production of good castings, could be studied. The experience gained from the continued casting of bronze works, which could be applied to iron castings, and the great advantage possessed by these foundries of having to work only for specialties, and of having not, like other foundries, to change the class of work to be done every day, exercised a great influence upon the gradually improved preparation of the suitable sorts of molding sand.

Even in Paris it was impossible to get from natural sources a sand that would fulfill all requirements, although remarkably good sand is easily obtained there. Only a few districts of England and Germany participate in this advantage, and the neighborhood of Halle-on-the-Saale and of Walkenried, in the Harzer mountains, should especially be mentioned in this respect. It thus became necessary, even in Paris, to prepare good and useful sand by artificial mixture. Four different sorts of sand, two of a reddish and two of a greyish-yellow color, were found to be applicable for casting in green sand. A variety of sand similar to the latter was found in exceptional instances in the neighborhood of Ilsenburg, but, as mentioned already, it could only be obtained in an insufficient quantity, and not of quite as good quality as that found at Paris. Comparing the Ilsenburg sand with the samples obtained from Paris, it was found that the former was deficient in the contents of fine grains of quartz, whence its penetrability was not the same as that of the Paris material.

The treatment above referred to of the sand consisting of a mixture of fat loam and coarse grains of quartz, the insufficient penetrability of which had to be increased by continued drying or roasting, had to be applied also to the fine sand, and it had to be ascertained whether the deficiency in the contents of grains of quartz could not be replaced by the roasting of a part of the denser sand, which was consequently exposed to such a high temperature that the yellowish-gray color was changed into red. The mixture of this roasted sand with the original yellow-grayish sand in its natural state, gave the desired result, and the roasted sand was found to be a perfect substitute for the grains of quartz in which the natural sand was deficient. In order to make, however, this artificial mixture equal to the natural sand, a careful treatment was necessary, and for this purpose stamping mills and revolving drums of oval section, containing loose balls, were adopted for the powdering and mixing of the sand. These drums have a diameter of about 3½ feet, and a length of not more than about 4 inches, while the speed of rotation is arranged in such a manner that the balls are not so acted upon by centrifugal force as to prevent them from remaining at the bottom of the drum, or they would not exercise the necessary pressure upon the sand, which is put into the drum through an opening at the side. In order to obtain the required fineness of the sand, the passing of it through fine meshed sieves becomes necessary, and for this purpose bolting cloth made of sheep's wool, and known in Germany under the No. 16, has been found best.

A fine molding sand applicable for most castings in green sand was thus successfully produced, but the finer and better sorts of a reddish color seen and found at Paris, which possess an extraordinarily high amount of penetrability, and which, moreover, allow of the cleanest and sharpest castings being made, were still wanted. It had been especially observed that the castings in this sand, which was even moistened to a great extent, remained unusually undisturbed, and it became, of course, a natural necessity to possess a molding sand of equal quality.

At first an endeavor was made to discover such a sand in a naturally loose state, and it was thought that it might be found in the intermediate layers of the colored sandstone formation met with on the outskirts of the Harzer Mountains. All the sand, however, that could be found in a loose state in these strata contained too much clay for the required penetrability. Even after roasting it was found to be useless, because it had lost all its binding power, and attention was then directed to the solid sandstone, which, when ground, was expected to supply material of the necessary quality. The experiments made with these solid stones showed such a great penetrability that the best results could be obtained. The experiments with water pointed fortunately to a certain class of stones which had to be rejected for building purposes on account of their extraordinary hygroscopic qualities; these latter, however, justified great expectations for the molder—expectations which have now for many years been entirely fulfilled. The mixture of the sand obtained from the stone, with the yellowish-gray sorts of sand mentioned above, has produced an exceedingly suitable molding sand, the molder having it in his power by adding more or less of this ground stound, to vary the quality of the material in accordance with the requirements of the work he has in hand.

The knowledge of the proper molding sand required for a given pattern, is the best proof of the ability of a molder and such a knowledge can only be acquired by extended practice and correct advice, which latter, however, is unfortunately very often wanting in foundries producing inferior work. The importance of the correct preparation of the sand is in general little appreciated, and so long as no proper attention is paid to the requirements of a good molding sand, and as long as there is wanting a correct understanding of the required penetrability in connection with a consistence of the material sufficient for the finest impressions, iron foundries will turn out works of art which could not be appreciated by eyes which have had opportunities of getting acquainted with more perfect productions.

From what has been said above, it will be found that the excellence of the molding sand to be used does not depend so much upon the chemical composition, but rather upon the mechanical and correct mixture of the argillaceous and silicious components. If the chemical investigations made in Paris and London with the small parts of molding sand that remained at those places on the castings exhibited by Ilsenburg, had been ever so carefully performed, they could scarcely have led to the preparation of a suitable molding sand, which depends simply upon the shape and size of the added grains of quartz, and the plastic qualities of the clay.

In the course of years a special custom has often taken root in foundries, in consequence of which most extraordinary results are often produced. The practice acquired in the manipulations can go so far, for instance, that a sand possessing a very small amount of binding power, but a high degree of penetrability, as often found in nature, is used with the best results. The ability acquired to produce fine castings in a loose sand, which gives way to the smallest shaking, which possesses only so much consistency as is required to withstand the pouring in of the fluid metal, and which combines the advantage that the larger quantity of grains of quartz prevents a burning of the iron, and produces better castings requiring only little cleaning, is a great gain, which saves many expenses incurred by the employment of a molding sand of greater binding power.

* It should be mentioned here, that in examining the sorts of sand, care has to be taken that the latter does not contain lime, which is often the case when the sand is found to lie on marl, and the greatest care should be taken in obtaining it. The burning of the lime, which takes place at the high temperature of the iron, forces the carbonic acid to escape, disturbs the fluid iron, and prevents the exactness and clearness of the casting. It is suitable to examine the amount of carbonic acid contained in the sand before using it, by pouring upon it sulphuric acid.

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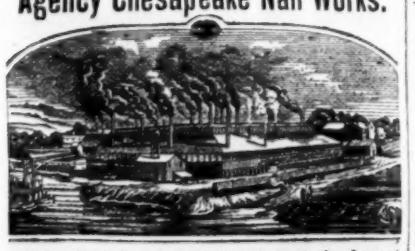

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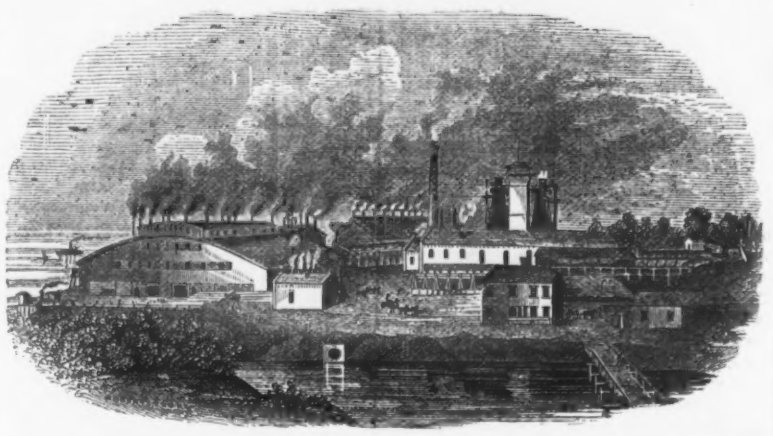

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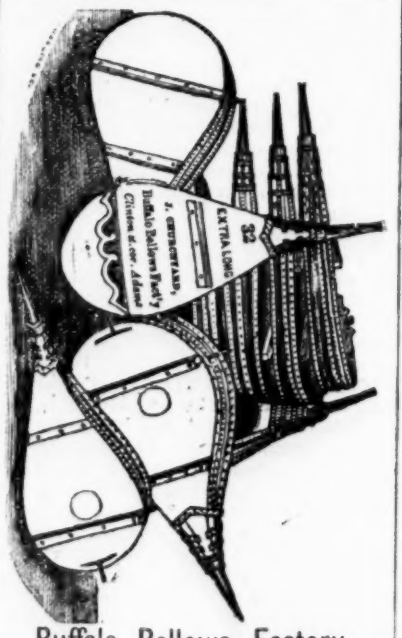

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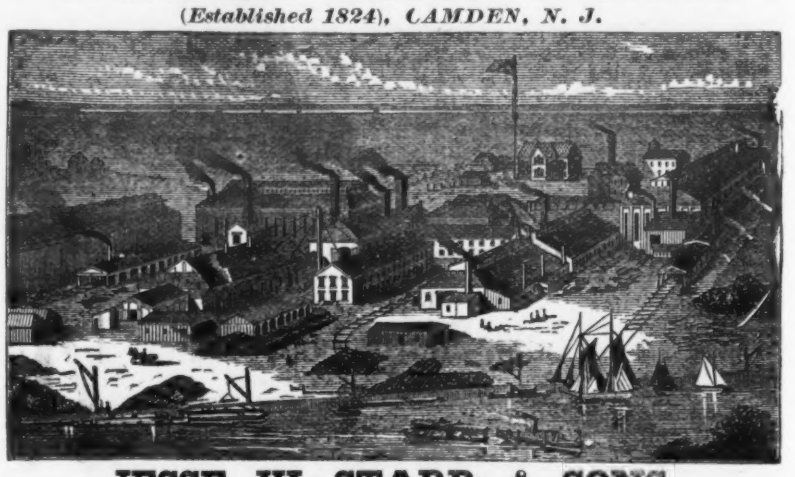

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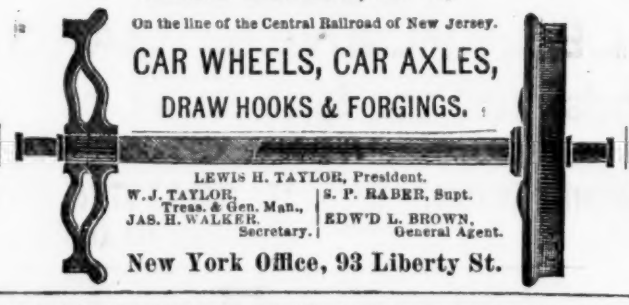

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Is There a Loss of Power by the Crank?

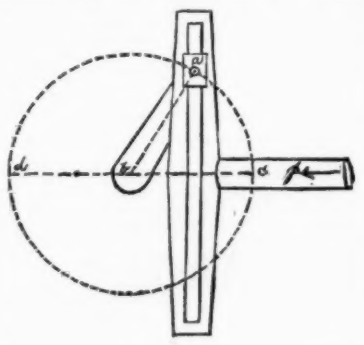
To the Editor of The Iron Age: DEAR SIR.—It would be strange indeed, if it were true, that the theory of the crank has been neglected by scientific men, and that the true principles of its action were never properly explained until the present time. Such I understand to be the position taken by Mr. Boynton in his article on the subject, recently published in *The Iron Age*. As a matter of fact, the action of the crank has been explained by Professor Rankine, Mr. Bourne, Scott Russell, Tredgold, and numerous other writers of eminence. Mr. Boynton's reasoning, which displays great ingenuity, is founded upon an assumption which is totally false, whence, as might be expected, the conclusions derived are erroneous. The proof that there is no loss from oblique action in the crank, has been frequently given, and the fact is as well established as is the impossibility of constructing a machine that will create force—and I would not trespass on your space with any more remarks upon so trite a subject, except that the publication of Mr. Boynton's article in your columns seems to invite criticism. It will not take long, however, to undermine the structure that this gentleman has raised. The two statements given below, if true, will establish all of Mr. Boynton's conclusions, and if false, will destroy them all.

"No resultant of oblique acting force or forces can equal the primary or primaries."

"The primary power=the pressure on piston or crank pin multiplied by velocity of crank pin."

The first statement is true, in a sense, of statical forces, which merely produce pressure. Thus, if a force of 4 acts in a horizontal direction, and a force of 3 in a vertical direction, the resultant pressure is 5, less than the sum of the components by 3+4−5=2. But let these forces tend to produce motion in the body on which they are acting, then if the first force would move the body horizontally 4 feet in one second, and the second would move the body vertically 3 feet in the same time, the true resultant motion is 5 feet in a second, in another direction, all of the force that could produce motion having been used in that way, and the remainder, which from the circumstances of the case could only produce pressure without motion, is apparently lost. But pressure alone, unless it acts through space, does not produce any power, and hence there is no loss of mechanical effect due to that portion of the pressure which does not produce motion. For instance, if the steam pressure is exerted on the crank pin without producing any motion, this mere pressure calls for no expenditure of steam, and there is no loss of mechanical effect.

The statement that the primary power is equal to the pressure on the piston, multiplied by the velocity of the crank pin, is erroneous, and is the result of the conclusion that wherever pressure is applied, power (or pressure acting through space) is developed; but, as has been shown above, power can only be required when there is both pressure and motion. In any case of motion with equilibrium, the power and resistance are inversely proportional to the distances passed over by each in a unit of time. This is a fundamental proposition of mechanics, which I presume, it is scarcely necessary



to demonstrate here, as no one will be likely to deny it. Now, Mr. Boynton has shown clearly that the resultant pressure on the crank pin, tending to produce motion, is 0·6336 of the oblique pressure on the crank pin, or the pressure on the piston. The distance passed over in a unit of time by the piston being taken as unity, that passed over by the crank pin in the same time will be 1·5708, hence the primary power, developed in any time t, calling p the pressure on the piston, and s the length of stroke, will be $p \times s \times t$, and the resultant power will be $0{\cdot}6336\ p \times 1{\cdot}5708\ s \times t = p \times s \times t$, or the primary and resultant powers are the same. I have added a figure, illustrating the yoke connection, in which the obliquity, resulting from the finite length of the ordinary connecting rod, is avoided, and which, therefore, represents the case assumed by Mr. Boynton in his article. It is easy to see, from this figure, that while the piston is moving a distance represented by $c\,d \times 2$, the center of the crank pin passes through a circle whose radius is $b\,a$, and that while the primary and resultant pressures are to each other as 1 to 0·6336, the primary and resultant velocities are to each other as 1 to 1·5708, so that the primary and resultant powers are to each other as 1 to 1, or, in other words, are equal, and that hence no power is lost.

This manner of confounding pressure and power as synonomous has been, and probably will be, a stumbling block in the way of many; but I hope that these remarks have put the theory of the crank plainly before your readers, and that they may be of some avail in correcting the evil tendency of articles like the one under consideration, in which false conclusions are so ingeniously intermingled with abstruse reasoning as to make it difficult at first sight to distinguish between truth and error.

Respectfully, RICHARD H. BUEL.

The Blast Furnace as Applied to the Cupola of the Iron Founder.

BY ALEXANDER LAIRD.*

Since the introduction of the cupola or blast furnace by Fulton, of Glasgow, in the year 1802, it has undergone but little change, either in form or proportion, and its adoption has now become general in almost all engineering establishments as being the most convenient and economical furnace for melting pig iron. The universality of its employment suggests to us either its perfect adaptability to the purpose for which it is required and used, or a degree of laxity, or an indifference to efforts at improvement on the part of engineering generally, which is not usually met with.

That it fulfills to a very great extent the requirements of the iron-founder and the engineer is granted on all hands. Still the daily experience of its working as regards the qualities of the metal melted, and its own cost, suggests the need of investigation in a scientific direction, as to the possibility of its modification. Great diversity of opinion exists on this subject, and that not only in relation to the form and proportions of furnace, but also as to increasing and improving the quantity and quality of the iron produced by its agency. The question of reducing the expense of the process is, of course, an important one in addition. Time will not permit me now to enter upon an enumeration of the various devices proposed or introduced for effecting these objects. Many of them have been of little scientific importance or value. In some instances they have been brought forward in the furtherance of particular views held by the proposer, or to uphold a patent in which he had a pecuniary interest. It is only of late that distinct ideas seem to have been formed and advanced on the subject. As a consequence, a great many experiments and tests have been made more or less valuable or accurate, and of greater or less importance. If the results of these had been gathered and collated, they might have been of much interest and value to engineering and metallurgical science. The isolated and desultory manner in which they have been made and obtained, has rendered them useless to the interests of science, and they afford no general information of any real service.

We have already referred to the universality of the cupola for melting pig iron. It is now proposed to attempt an elucidation of the principles upon which the cupola furnaces are constructed and worked. Heat is most economically and best applied when used on the principle of being applied under the mass of the material to be consumed or operated upon. By this arrangement the air supplied to support combustion is made to pass through this material on its way upward toward the furnace top. In the air furnace, on the contrary, the fuel is never allowed to be in contact with the charges of iron, as the material is situated at the opposite extremity of the hearth. In the cupola the metal and the fuel are deposited in alternate layers upon each other, and thus become intimately blended and united in the course of the fusion and descent of the iron into the hearth. This latter condition will be sufficient to account for that superiority in point of economy which is acknowledged to exist in the cupola as compared with the air furnace.

When cupolas were first introduced into foundries, they were recommended for the great reduction they effected in the consumption and expense of fuel. It has already been explained that it is well adapted by its form and the disposition of fuel and material to work economically. No hesitation need now be felt in asserting, also, that this economy can be very much increased by raising the depth over the tuyeres; that is to say, by running up the cupola to a greater hight, and filling up with more numerous and higher charges. The most intense heat is evolved first at the surface of the flame, or line of union between the gaseous combustible and the air; and as in the cupola the surface extends over the whole lower stratum of the fuel, an immense quantity of heat is thereby generated. This being carried upward with the intensely heated products of combustion, it becomes deposited in the mass of coke or fuel above. From the slow transmitting power of this substance, it is well able to retain what it receives. By these means it soon accumulates so as to become a magazine of heat of the most intense and dazzling brightness, while the body of the fuel being decomposed sinks down to replace that which has been consumed. It is well known that the point of fusion in a cupola or furnace of this kind, using the blast cold, is situated about two feet above the tuyeres. We can thus readily recommend the importance of great hight above the tuyeres. Indeed, the only limit to the increase of this hight are those of stability, and the danger arising from irregularity in the working and position of the charges.

There is, it is true, one objection which is sometimes urged by iron founders against running up the wall of their furnace, and that is the increased labor and cost of raising the materials to the charge-hole of the furnace. This objection is not worth much in an age of mechanical skill, ingenuity, and labor-saving. Why, even without mentioning the resources of applied mechanics, we could by the utilization of the waste heat and gases gain sufficient power to overcome this objection to increased hight. Much more might be added in favor of high furnaces, and the advantage accruing thereby. As to the necessity of such improvements, it is made manifest by the daily experience of all who observe the vast volume of flame and heat belching from the top of our cupolas, which higher walls and deeper and more numerous charges would assuredly prevent.

We have yet to deal with the higher and more recondite question to be considered, as to the kind or quality of metal in the cupola under the conditions we have just detailed. What, for example, are the influences resulting to the metal from its immediate contact both with the fuel and blast? By way of illustration, let us say, then, that it is impossible to conceive a more unfortunate and unscientific method for the purpose of producing a highly carbureted or soft cast iron than the arrangement adopted in the ordinary cupola, or blast furnace. The melted metal trickling, as it does, in drops or small rills in its descent to the hearth, must fall into, mix with, and be dashed about by the violent tornado of fresh air from the blow pipe. Part of it may be protected by the coke, or escape between the tuyeres. Perhaps it may be cooled and oxidized, and, combining with the flux, melt into a brown glass. Part again will catch fire, burn and blaze with great violence and reduced to vapor, be carried up with the stream of air to be again deoxidized by its passage through the carbon in the upper region of the furnace, or it may pass off at the top of the furnace. If to these we add the contingencies of the strong tendency possessed by cast iron to combine with oxygen at high temperatures, and its extreme inflammability, we shall at once see how readily these latter substances dissolve their union or cast iron partnership, if we may so call it, to form new unions of their own with the oxygen of the atmosphere. It is a remarkable fact, and one worthy of observation, that softness of castings was a general complaint on the first introduction of the cupola, a complaint which has, however, now died out, and which gives no trouble to the ironfounder of the present day who uses cheap and inferior fuel. The tendency of this combination, as already remarked, was to render the iron soft, and to make it very fluid when melted, so that it might run into the finest and most delicate mold.

Among the many contrivances introduced or adopted to overcome the oxidizing influence of the cupola form of furnace, one of the best and most successful is that of Mr. Eichhorn, which has been experimented with for some time with great success in Germany. The principle of this is, that the blast before entering the cupola is made to descend and pass through a mass of burning fuel. The temperature of the blast is raised, first by contact with the heated bricks, and secondly by radiation into the air chambers from the incandescent fuel; the third, and by far the most important and useful condition, is effected by its actually passing through the fuel.

In the earlier stages of cupola construction, considerable importance was placed on the influence of form and size. The horizontal interior section of all cupolas is circular, however different in other respects they may be, and the principal varieties of cupola may be arranged or classed in four divisions, founded on the form of the vertical section through the trunk.

First, those cupolas taken from the hearth upward to the charging door. Secondly, cylindrical cupolas, or such as are parallel in section under the charging door. Thirdly, expanding cupolas, of which the sides widen from the neighborhood of the tuyer upward; and, fourthly, cupolas in which the form is a combination of two or all these figures.

The first and two latter of these forms have become, for all practical purposes, extinct, while the second or cylindrical cupola has been universally adopted. This partiality is easily understood, for in charging parallel cupolas, the fireman can more precisely distribute and regulate the proportions of his charges in accordance with the purpose he may have in view than he can in dealing with the tapering cupola.

In the former the materials descend regularly, without altering their arrangement, till they reach the neighborhood of the tuyeres, where the iron ought to be melted, and the unconsumed coke is pressed gradually and equally down to make way for the superincumbent charge. Thus the process goes on in a secure and well ascertained manner, whereas, in the tapering cupola the firemen are inconvenienced for want of space to deposit their charges, and the materials having to spread into the large expanse below the door, cannot do so equally, and thus, by an unequal mixture of material, the iron is unequally heated. But, to shorten this discussion, it may be said that the best, and, indeed, the only true means of ascertaining the relative efficiency of various forms of cupolas, is to compare the relative quantities of fuel consumed with those of the iron melted. Economy of fuel and rapidity of fusion, which generally accompany each other, are indeed the touchstone of excellence and the test of efficiency.

The opinion has already been expressed that the cupola was well adapted, by its form and construction, to work economically, on account of its parallelism of section vertically, and that this economy is capable of indefinite extension by an increase of vertical depth over the tuyere. But the greatest source of waste inseparable from the principles and working of the cupola is the unavoidable loss of heat which takes place by radiation from the outside of the cupola, and long conduction through the hearth, the amount of such loss being in the ratio of the diameter and its vertical hight. This loss at times is very considerable, and more so in the case of small furnaces, or when the inside lining is thin and badly constructed. Indeed, we have known an instance of this kind where the heat from radiation outside the casing of the furnace was greatly in excess of the thermometer's ability to register it with accuracy. This was on account of the excessively high temperature around the skin. The importance of retaining as much as possible of the fugitive heat to the charges, and preventing its escape from the furnace, whether it be from radiation or from the furnace mouth, ought to be fully recognized in the construction and management of a cupola. Natural and obvious as this condition is, there is nothing more common than to witness everywhere furnaces in use wherein those self-evident conditions appear to have been disregarded or ignored altogether. One effect of this, of course, is to cause an excessive expenditure of fuel and heat which simple mechanical expedients would have obviated and overcome. In reality, it is impossible to over-estimate the value of a true knowledge of the principles and nature of combustion in furnaces; more particularly this is so in regard to those where the air is forced into the furnace by means of a blast like that of the cupola. The subject, however, is so prolific and complex that we cannot attempt to dispose of it within the limits of a single paper. It will be sufficient to enumerate a few of the more salient points, and then to leave the whole question for reflection and discussion.

Having referred to some of the various forms of furnace and their effects on the operations of smelting, it becomes our duty to refer also to two or three of the most favorable conditions of fuel and blast, viz:

From the nature of the cupola furnace, air should enter in efficient quantities to maintain the necessary supply of heat, and that, too, at lateral apertures around the alternate layers or strata of materials and fuel, and these, as we have already seen, are arranged under the most favorable conditions when mutually acting and reacting on one another.

Regarding the quantity of fuel per ton of metal melted, there exists a great amount of uncertainty and misconception, and these would be difficult to remove or displace. In endeavoring to do so we should have to deal with the composition and combustion of fuel. These are so exceedingly various that it would be quite impossible to give anything like a minute description of them.

The task is rendered yet more difficult by the introduction and substitution of cheap and inferior fuel, now so common in some establishments, and which is owing to the exceptionally high price of coal. This circumstance overthrows the experience and data of former years, and hampers the efforts and ability of all interested and concerned in furnace economy.

We must now pass on from the question of fuel to that of the blast. Here, again, we find that there exists much uncertainty and many different opinions. For example, it has long been the belief of some iron founders that a stiff, sharp blast, or, in plain language, a concentrated jet of air was indispensable in all cases to the economical management of a cupola. Such persons, in realization of their pet theory, contract the aperture of the tuyeres and increase the velocity of the blast. On the other hand, there are the disciples and advocates of a more open and diffused blast, and who multiply the tuyeres and work them alternately, in order that they may spread and diffuse the blast over the horizontal area of the cupola. These base their opinions on the results obtained from the air furnace, where a chimney of a moderate hight and proper dimensions is sufficient to generate a heat so bright and strong as to vie in brilliancy with the mid-day sun. They urge that the distribution of air with the material is calculated to produce a uniform application of heat throughout the whole area of the furnace.

For some time after the adoption of the cupola in cast iron foundries, it was felt to be a desideratum to obtain a uniform and equal blast. Many schemes have been resorted to to effect this important end. The blast cylinder with a vessel inverted in water was devised, among other plans, but it had this drawback, that the air sent into the cupola was damp, and thus hardened the iron. Then the founder had recourse to a bored cast iron cylinder, but the friction of the piston rendered its operation imperfect and incomplete. Another plan was that of having two cylinders working alternately and exerting an equal force. This was costly in construction, and afterward required much power to work it. The summer of 1829 witnessed the introduction of the fan blast—at the instance of Messrs. James & Charles Carmichael—and then the cupola became the most perfect appliance for melting cast iron which it seems possible to contrive or suggest. Its advantages were—first, with regard to saving of power as compared with the blast cylinder, for it sent double the quantity of air into the cupola. Secondly, that the blast was uninterrupted. Thirdly, owing to the great quantity of air injected with so perfect a regularity of force, the resulting metal was both softer and more uniform in quality than it had hitherto been; and, fourthly, that it effected a considerable saving of time in the process of melting.

Having already referred to the effects of a compressed and diffused blast, it will be well to bear in mind that a considerable variation in the pressure and the quantity of the blast is necessary to suit the different qualities of the fuel employed in melting furnaces. The variation of pressure is as much as for 1¾ lb. to 3 lb. per inch, the stronger blast being used for the more inferior coke. There is, in truth, no doubt that differences in the quality of the coke subjected to the action of the blast do, in some measure, account for separate preferences respectively held in reference to forcible and different blasts. There is, to my thinking, great necessity for regulating the quantity of force of the blast by some fixed rule, if that rule can be found.

A brief discussion on this paper was adjourned.

* Read at a meeting of the London Association of Foremen Engineers.

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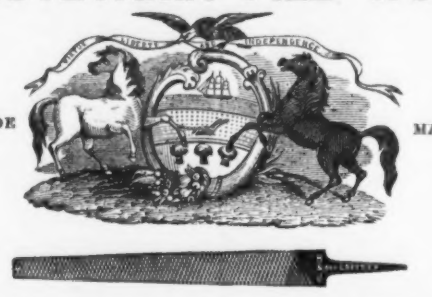
TRADE  MARK

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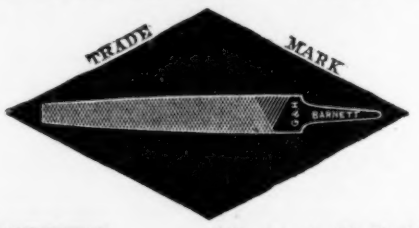

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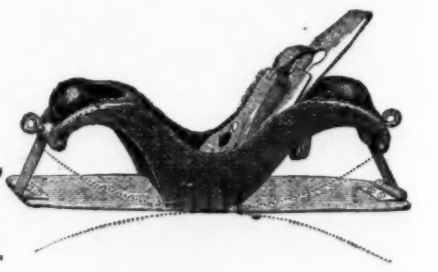

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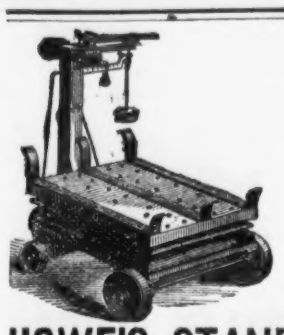

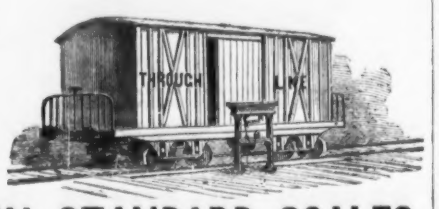

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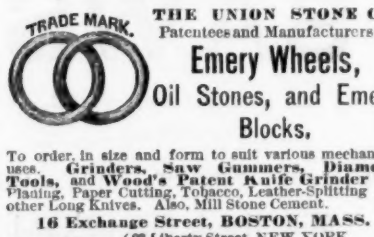

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The experience of the TANITE CO. is the combined experience of all its customers in all branches of business in all parts of the world. THE TANITE CO. manufacture both the Solid Wheels and the machinery to mount them on, and study both the general and the special uses of these goods. If inexperienced *users* will buy goods of equally inexperienced *makers*, they must expect *failure*, and only failure!

You had better decide at once to deal *directly* and exclusively with some one Standard Company, who make both Wheels and machines, than wander around, experimenting with all the new makers that appear in the market.

Deal *directly* with us; try till you get suited, and then *stick to us!*

Real Bronze Door Knobs,

BUTTS, &c.

Golden Bronze Knobs

AND

HARDWARE.

Round and Hexagon Inside and outside Door Knobs, and combined Escutcheon; beautiful patterns and superior finish, retaining color; Real Bronze. The list includes several SPECIALTIES—the cheapest and best bronze work offered. Bell Pulls, Sash Lifts, Shutter Bars, Sash Fasteners, Escutcheons, Bell Levers, &c.

JAMES E. HALSEY, Sole Agent,

76 READE STREET, NEW YORK.

Ford's Pat. Stove for Heating Air for Blast Furnaces

Adopted at 13 different Furnaces.

West Point Foundry,

Cold Spring, N. Y.

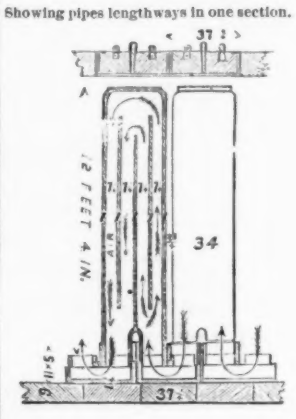
PAULDING, KEMBLE & Co.

30 BROADWAY, NEW YORK, sole Proprietors for the United States

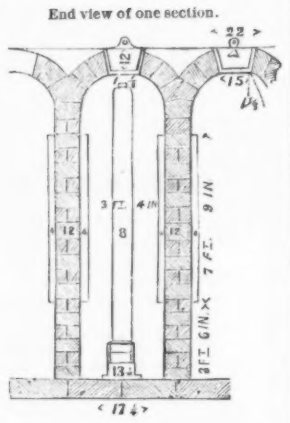
JOSEPH CRAMPTON, Agent,

23 19th Street, Pittsburgh, Pa.

Showing pipes lengthways in one section.



End view of one section.



REFERENCE.

PHILADELPHIA, Nov. 16, 1872.

PAULDING, KEMBLE & CO.:

GENTLEMEN: We have five sections of the "Ford's" Ovens in use since blowing in our new Furnace on the 21st of October. The Ovens have given entire satisfaction; we consider them superior to any Cast Iron Oven in use; they heat the air to a greater degree with much less gas and heat on the brickwork than the Player Ovens; they cost less for construction, and, we believe, will prove more durable, and less expensive to keep in repair. Our main difficulty thus far has been to keep the heat down to 1000 deg; our average is from 1100 to 1200 deg.

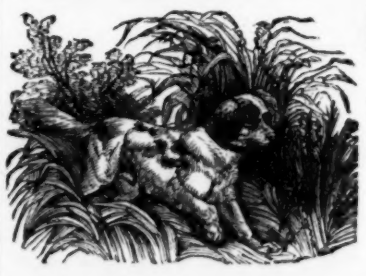
In all cases the Cast Iron Key Boxes to form the arch should be filled in lightly with fire-brick blocks, laid dry and covered with loam, or, *better*, a cast iron plate, to cover the top, with a ring in it, so as to be easily removed.

We built our ovens in one block, entirely of *fire brick;* the cost of the brick work entire was about 5000 dollars, say about 1000 for each oven.

We put 4 courses of fire-brick in the bottom, laid on a loose slate rock, laid dry, and well grouted each course with Kaolin grout.

We can recommend the Ford Ovens with great confidence to iron men who wish to construct the best kind of ovens in use in the United States. Yours, truly, J. B. MOORHEAD & CO.

P. S.—Our Furnace is now on her 3d week, making about 28 tons per day good Foundry Iron—15 feet bosh, 50 feet high.



Embossed Dog Collars.

An Improved Style of Dog Collar made of Oroide and embossed with Fancy Patterns, which Prevents their becoming tarnished or scratched. Also, German Silver, Silver Plated and Bronzed.

Manufactured by

W. T. & J. MERSEREAU,

62 Duane Street, NEW YORK.

For Sale to the Trade only.

Something New for

OTIS FURNACES & MINES.

New Union Steam Safety Elevator,

How One Works.

RIVERSIDE IRON WORKS, DEWEY, VANCE & CO., Wheeling, W. Va., January 14th, 1873.

Messrs. OTIS BROTHERS & Co., New York.

Dear Sirs: The experience of a year proves that ***your Furnace Elevator is superior to all others in use.*** We have in the six weeks from December 1st to Sunday last, 12th inst., made ***2724 tons, 1401 lbs. Pig Metal,*** or an average of near ***65 tons per day,*** which required the elevator to ***lift 72 feet high*** 4½ tons Ore, Coke and Limestone for each ton of metal produced, or ***more than 11,500 tons material in the 6 weeks.*** The largest yield in ***one*** day was ***81 1-4 tons*** Iron, involving the lifting of ***345 tons*** material ***in 24 hours.*** This has all been done to ***our satisfaction,*** and that, too, in the ***coldest weather we have had.*** Other furnaces with ***water*** and ***pneumatic hoists*** have experienced ***great difficulty,*** on account of the ***water freezing*** in the ***tanks;*** and in the case of the ***air*** hoists, we understand that two furnaces, not far from us, ***had*** to ***"blow out,"*** from being ***unable to hoist stock*** during the ***"cold snap."*** The difficulty, we are told, was caused by the ***condensed moisture*** in the ***blast freezing to the sides of the cylinders,*** so that the ***piston could not move*** up or down.

Very truly, yours, DEWEY, VANCE & Co.

Send for Circular to

OTIS BROTHERS & CO.

348 Broadway, NEW YORK.

BUSINESS ITEMS.

NEW YORK.

The Ulster Blast Furnace, of Napanoch, Ulster county, went in blast the fore part of this month. This furnace has been entirely rebuilt, and new blast ovens and blast apparatus, generally, has been put in, with new hearth, boshes, and tunnel head, all of the latest and most approved styles. The furnace is 46 feet high and 12 feet across the boshes. It is now running very nicely, making from 14 to 17 tons of good foundry iron per day. The blast is furnished by water-power, and one of the best and most reliable water-powers in the State. The furnace starts in with a large stock on hand, consisting of about 3500 tons coal, 1500 tons ore, and 1000 tons limestone. It has an iron mine of carbonaceous ore, yielding 30 to 40 per cent. of metallic iron, within half a mile of the furnace, and a lime quarry of very good lime within the same distance. G. L. Smith, of Elmira, N. Y., is the proprietor.

NEW JERSEY.

The Elizabeth *Herald* says: "Owing to the great demand on the Singer Manufacturing Company at present they are unable to cease operations in their old factories, in order to make a transfer to their extensive works in this city. They are now shipping between five and six thousand machines weekly, and have nearly exhausted the surplus stock they generally keep on hand. These sales are unprecedented in the experience of the company, and at that rate their sales for the present year will amount to over 300,000 machines. Owing to this tax upon their facilties they will be unable to get their new works here in full operation until winter, when navigation has closed.

PENNSYLVANIA.

The Catasauqua Manufacturing Co. are erecting a new heating furnace at the Fern Dale Mill. They have in course of manufacture a new train of 21 inch rolls, to be used instead of the 17 inch rolls now in operation in that mill.

The Susquehanna Iron Company's mill is running double turn on merchant bar. Last year's product was 6000 tons. The mill contains three heating and twelve signal puddling furnaces.

The Glen Rolling Mill, Allentown, now turns out four inch round iron.

Allen, Wood & Co.'s new mill at Conshohocken, containing eight double puddling and six heating furnaces, is expected to start in October.

Messrs. Porter, Bell, & Co., Pittsburgh, have shipped to the government of Ecuador, South America, another beautiful narrow gauge locomotive, built expressly for ascending the lofty mountains of that country. This is the second locomotive of this class which the above firm has built for the same government.

The mill of Schall & Co., at Norristown, employs 90 men, and manufactures about twenty-five tons of merchant bars and plate iron per week. The mill contains five double puddling and three heating furnaces. The company contemplate starting their blast furnace Lucinda, which has been idle for some time in undergoing repairs, about the first of October.

MASSACHUSETTS.

Roche Brothers are preparing plans for a boiler and machine shop on their lot at Brightwood, the next north of Talcott's foundry, but will not attempt to move before next year.

Exley & Parsons, Marlboro, employ seventeen hands in the manufacture of all kinds of boot and shoe machinery. They also built the "Marlboro steam engine."

The Gosnold Iron Works, of New Bedford, have resumed work after a suspension since the 3d of July for repairs to the machinery.

The Wheeler Iron Foundry, at Worcester, established in 1825, has been purchased, the present season, by Stephen Holman, of the Holyoke Machine Co., together with all rights, interests and fixtures, as well as a great accumulation of patterns, necessary to an establishment of this kind. Mr. Holman has formed a copartnership with Edwin Pierce and M. P. Kiley, for the purpose of carrying on the foundry business, and the establishment will in future be designated as the "Wheeler Foundry." The present company, in addition to the several branches of machinery castings as carried on in the old establishment heretofore, will make a specialty in the manufacture of annealing pots and window weights, as well as gears, pulleys, couplings, hangers, corn and plaster, crackers, in fact all kinds of machinery castings known to the trade. The company are employing at present 46 men, with a prospect of soon needing to increase this force.

Wilder & Brown, of Fitchburgh, successors to A. D. Waymouth & Co., are manufacturers of Waymoth's patent variety wood turning lathe, and do a large amount of wood turning, including among their products 2,000,000 button molds a month, for ladies' dresses, and 200 shells a week for ice pitchers. They turn out about $30,000 worth of goods a year, which are sold mainly in New York and Boston. Their factory is 50x25 feet, three stories high, furnished with water-power for running their machinery.

The Fitchburg Machine Company is to furnish the machinery for the repair shops of the Chicago and Northwestern Railroad Company, at Chicago.

The Beverly Steam Engine Company manufacture stationary, hoisting, tug boat and other engines, as well as all descriptions of machinery. They have several specialties, including engines for stone quarries and vessels, isinglass rolls and presses, etc.

The Gosnold Iron Works, of New Bedford, have resumed work after a suspension since the 3d of July for repairs to the machinery.

RHODE ISLAND.

The American Screw Company, of Providence, are erecting new buildings, and preparing to consolidate there some of the branches of its works. The first removal will be that of its Bay State Mill, now at Taunton, Mass.

The Providence Steam Gas Pipe Company was established in 1850, but a stock company was organized in 1864. The products of the establishment are the manufacture of steam-heating apparatus for manufactories. Beside this the company contract for building gas-houses for cities, towns and manufactories. Their building is of brick, 150x150 feet, and four stories in hight. They employ about 120 men, and at the present time are full of orders.

The New England Butt Company, at Providence, are engaged in the manufacture of cast butt hinges, of which they make every variety, polishing-irons, door-hangers, dumb bells, tobacco-cutters, tea scales and weights, cast iron brackets, &c. Their works are very extensive; the main building is 131x192 feet, built of brick in a very substantial manner; there is also a foundry, which has a frontage of 194 feet. About 175 hands are employed, and their products are extensively known throughout the whole United States.

CONNECTICUT.

This company began business in 1848 under the firm name of J. A. Fay & Co., but under the management of Mr. C. B. Rogers, they are manufacturers of all kinds of wood working machinery, and were the first who engaged, to any extent, in this branch of business. The name was afterward changed to that of C. B. Rogers & Co., and a stock company formed with a capital of $200,000. This concern makes planers and matchers, molding machines, mortisers, tenoners, sawing machinery of all kinks, turning lathes, boring machines, &c., in all, something over 100 different kinds and sizes. Several of the most important machines now in common use were first produced by them. Their machinery has a world wide renown, being in use in England, France, Germany, Austria, and other Eurpean countries, Australia, New Zealand, South America, the Canadas, and all parts of the United States. It has received the highest premiums at all the great exhibitions of the world; receiving a gold medal at the Crystal Palace, in London, in 1851; gold and silver medals, at Crystal Palace, New York; the only gold medal awarded this branch of industry at the Paris Exposition, 1867; and the medal of merit, of Vienna Exposition, 1873. They employ about 150 men in their works, and have connected a foundry, and make their own castings. They are one of the most extensive establishments of the kind in this country, and the reputation of their manufactures is a sufficient guarantee to all who have dealings with them.

OHIO.

Rust & Maltrup, Loudonville, manufacture plows, sawing machines, all kinds of castings, cider mill screws, drag and circular saws, &c. They have been established fifteen years. Occupy a building 60x80 feet, and employ 12 hands. They use 35 tons of iron per day, and sell from 20,000 to 30,000 plow points annually.

The Canton Iron Bridge Company's Works cover about eight acres. The works give employment to some 100 hands. The beam and channel truss is used for short, and the column and channel for long, spans. In 1872, 1400 tons of rolled iron and twenty-nine tons rivets were used at these works.

The foundry of Col. John H. Kelley, at New Lexington, is nearly ready to commence operations. The building is of brick, 74x60 feet, and fitted up in the most approved manner; there is also an engine room and shops connected with it.

The capacity of the nut and bolt works of Messrs. Arms, Bell & Co., Youngstown, is 80 kegs of nuts and washers, 30,000 carriage and tire bolts and 20,000 machine track bolts per day.

The Ironton *Journal* has the following: A visit to the new Etna Works above the city shows the outlines of the mammoth establishment, and gives an idea of the immense capacity they will possess, though at present not even all the foundations are laid. The two furnace stacks are situated about 30 feet apart, and will be 18 feet bosh and 90 feet high, of wrought iron jackets, filled with fire brick. The casting houses are each 127 feet long, 60 feet wide and 27 feet high, with iron roof. The stock house is in the shape of an L, of which the outside length is 521 feet, the inside 371 feet, 75 feet wide and 32 feet high, with slate roof; the boiler house is 91 by 86 feet and 28 feet high; the engine room is 96 by 86 feet and 36 feet high, both the latter with slate roofs; the hoisting house is 18 by 26 feet and 115 feet high, while the smoke stack will be 25 square at the base with a hight of 150. There are now about 3500 tons of native ore in the yard at the buildings, with 20,000 tons more on the Iron Railroad at Etna and Vesuvius furnaces and their switches, and they are receiving about 80 tons daily.

MISSOURI.

There are now upon the pay roll of the Vulcan Works, South St. Louis, 850 men; wages amounting to $50,000 per month. Nearly one hundred tons of railroad iron are made daily.

The Ozark Furnace Company, seven miles west of Rolla, organized this spring, are now building two furnaces, one hot and one cold blast. The rear of the furnaces is set right at the foot of and partly into a bluff, from the top of which the charges can be dumped into the furnace. The machinery is on the ground. The place selected is so close to the railroad track, that the latter will be used by the furnace company as a switch, and the railroad company will lay another track south of it.

INDIANA.

The Brass Foundry and Machine Works, of Fort Wayne, have filed their articles of association with the Secretary of State. Capital stock $500,000, in shares of $100 each.

An organization for the manufacture of Brown's rotary shuttle sewing machine has been effected in Indianapolis, with a capital of half a million dollars. A manufactory is to be erected soon.

Articles of association of the Green County Iron Works, capital $600,000 were recently filed at the office of the Secretary of State, Indianapolis.

An organization for the manufacture of Brown's rotary shuttle sewing machine has been effected in Indianapolis, with a capital of half a million dollars. A manufactory is to be erected soon.

MICHICAN.

Six capitalists of Battle Creek, have bought of B. I. Stowell, of Quincy, Illinois, the entire right to manufacture a newly patented hoe, and with ample capital will begin work immediately. The necessary machinery has arrived, and one of the company has gone East to purchase stock. From 50,000 to 100,000 are to be made this season in the threshing machine shops of Upton, Brown & Co.

TENNESSEE.

The Oakdale Iron Company, of Roane county, will this year complete a blast furnace with a capacity of 60 tons a day, on the De Armon place, at the head of the Tennessee valley. A village is springing up around it.

NEBRASKA.

The Omaha Smelting and Refining Company are doing a business of about $300,000 a month; the first year they did $50,000 a month. The directors are, C. Balbeck, president and superintendent; W. W. Lowe, vice president; C. B. Rustin, secretary and treasurer; C. W. Mead and E. W. Nash. They ship to New York and the United States mint.

UTAH.

A new foundry is to be added at once to the shops of the Utah Central, in Salt Lake City. The equipment of the machine shops has been increased by a large driving-wheel lathe and several other tools built by the New York Steam Engine Company.

HENRY DISSTON & SONS'

SAW, TOOL,

STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA, PA.

H. W. PEACE,

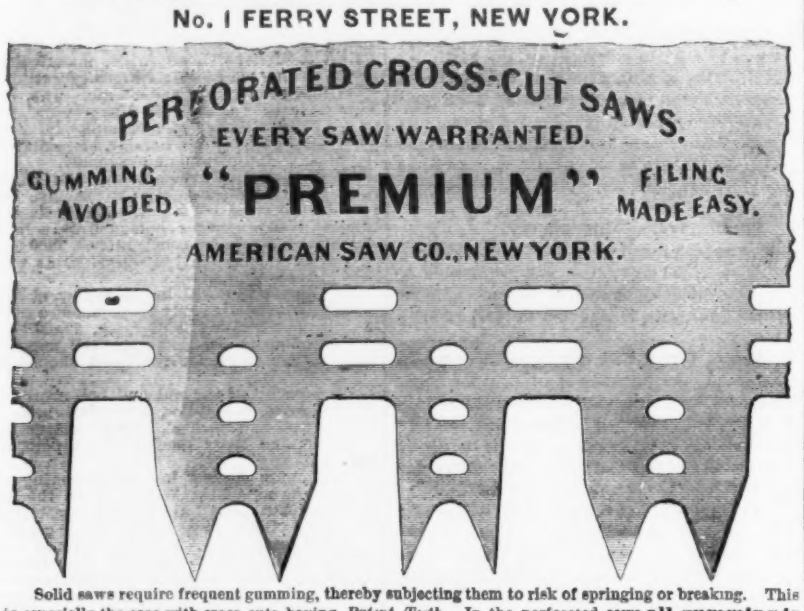
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

No. 1 FERRY STREET, NEW YORK.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided,** and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

WORRALL & CO.,

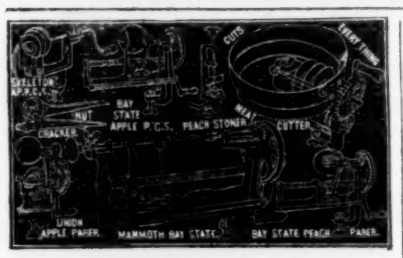
MANUFACTURERS OF

EXTRA CAST STEEL SAWS,

Plastering Trowels, Tools, &c.

Saw Manufactory, Iron Foundry & Machine Shops, ELIZABETHPORT, N. J.

Office and Warerooms, 28 Elm Street, New York.



D. H. Whittemore,

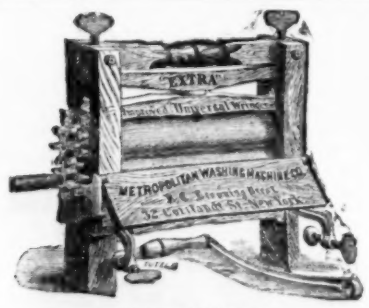
Worcester, Mass.,

Manufacturer of the celebrated

Bay State & Skeleton Apple Paring, Coring & Slicing Machines, etc.

Sold by

CLARK, WILSON & CO. and RUSSELL & ERWIN MFG., CO., New York.
WM. H. COLE, Baltimore, Md., and by dealers generally.



IMPROVED

UNIVERSAL WRINGER

Sold by Jobbers of Hardware and Woodenware everywhere.

Metropolitan Washing Machine Co.,

32 Cortlandt Street, New York.

WOODROUGH & McPARLIN,

MANUFACTURERS OF

PATENT GROUND

SAWS

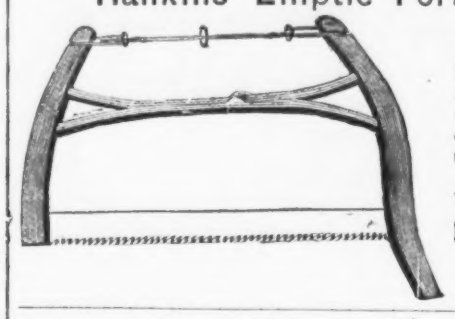
OF ALL KINDS, INCLUDING

HAND, PANEL, BACK SAWS, &c.

CINCINNATI, O.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The boxed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE

VULCAN SAW WORKS,

WILLIAMSBURGH, N. Y.

W. ROSE & BROTHERS

WEST PHILADELPHIA,

Manufacturers of

Plasterers' and Brick Trowels

Hammers and Chisels.

ALSO,

Saddlers' Round Knives, etc.,

N. E. cor. 36th & Filbert Sts.

☞ Please send for Price List.

E. C. ATKINS & CO.,

Indianapolis, Indiana,

Saw Manufacturers.

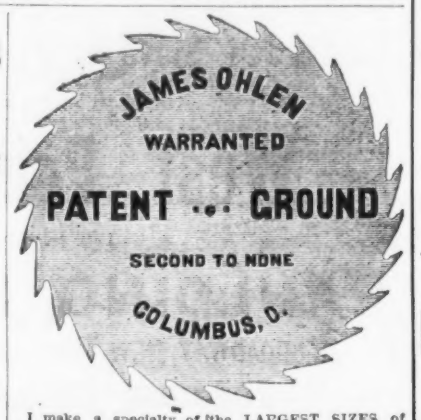
Best Cast Steel Patent Ground Saws.

Also, sole Manufacturers of Atkins' Patent

CROSS-CUT SAW HANDLE.

Best Patent Handle in use.

Manufactory and Office—**Nos. 210, 212, 214 and 216 South Illinois Street.**



I make a specialty of the LARGEST SIZES of **Circular Saws,** and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "**Challenge**" **Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

GEORGE GUEUTAL,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

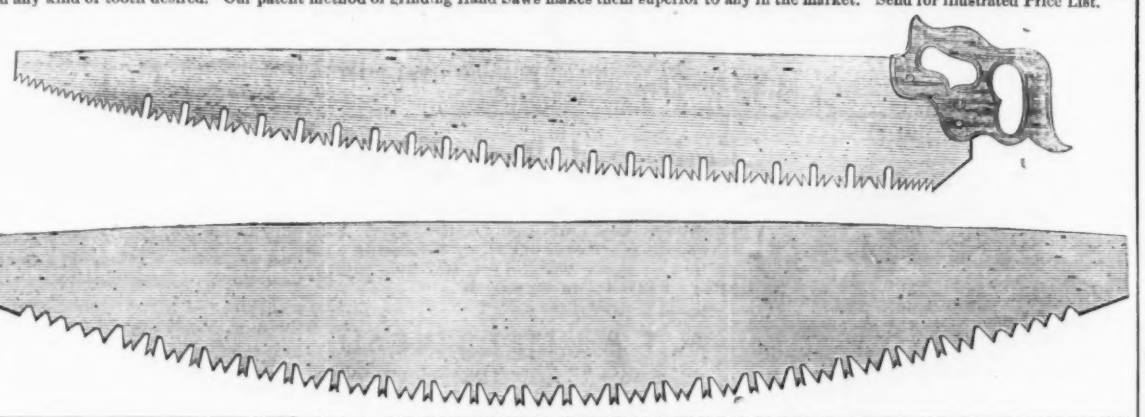
BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

J. FLINT & CO.,

Manufacturers of all kinds of SAWS and PLASTERING TROWELS, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.



Alexander Brothers,

Manufacturers of **OAK TANNED**

LeatherBelting

412 North 3d, Philadelphia, Pa.

WM. H. STOYLE.

MANUFACTURER OF

Machine Cut Belt Lacing,

No. 403 Library Street,

CORDAGE, ROPE, etc.

D. ALLEN'S SONS, Manufacturers,

136 Front Street, New York.

Manila and Sisal Cordage,

JUTE ROPE.

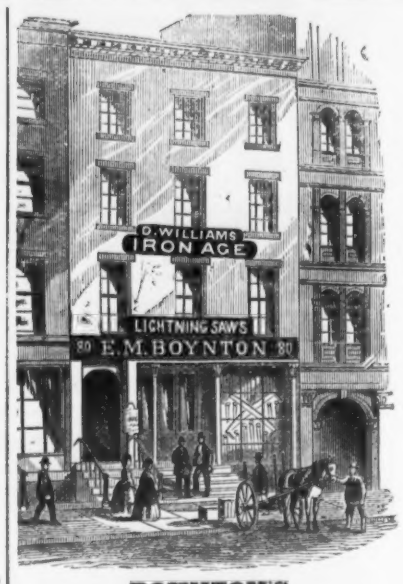
Send for Price List.

TUCKER'S ALARM TILLS,

FOR SALE BY

RUSSELL & ERWIN MFG. CO., New York; PRATT & CO., Buffalo; LLOYD, SUPPLEE & WALTON, Phila.; HIBBARD & SPENCER, Chicago; JOHN NAZRO & CO., Milwaukee; A. F. SHAPLEIGH & CO. & E. C. SIMMONS & CO., St. Louis.

TUCKER & DORSEY, Indianapolis Ind.



BOYNTON'S LIGHTNING SAWS.

Awarded the Medal of the American Institute, 1872.

Two Direct Cutting Edges, Instead of one Scraping Point. Note extra steel and durability over the old **V,** outlined on **M** tooth.

A Challenge of $500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their superior merits.

Our leading papers, such as the *Tribune, American Agriculturist, Christian Union,* etc., have published over sixty editorial notices recommending these Saws. Farmer's Clubs, Lumbermen, and Hardware Dealers unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.

Where the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of $6.

For Catalogue and additional information, address

E. M. BOYNTON, 80 Beekman St., New York,

Sole Proprietor and Manufacturer.

WM. McNIECE,

Excelsior Saw Works.

515 Cherry St., Philadelphia.

Manufacturer of

Extra Cast Steel Saws of every description,

Pat. Screw Socket Pole Pruning Saws,

Patent Screw Socket Edging Knives,

Patent Screw Socket Scuffle Hoes, and

Patent Screw Socket Paper Hangers' Scrapers,

Mowing Machine Sections of all patterns constantly on hand.

WHEELER, MADDEN & CLEMSON,

Manufacturers of Warranted Cast Steel

SAWS

of every description, including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws,

&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

97 Chambers Street, New York.

BRUNDAGE FORGED HORSE NAILS,

Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

WHEELER, MADDEN & CLEMSON

Middletown, Orange Co., N. Y.

RIEHLE BROTHERS,

Ninth Street, near Coates, **Philadelphia.**

New York Store, 93 Liberty Street,

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PEN AND POCKET KNIVES,
MANUFACTURED BY Aaron Burkinshaw. AB *PEPPERELL,* MASSACHUSETTS.
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The Miller Bros. Cutlery Company,
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FINE PEN AND POCKET CUTLERY,
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We warrant our Knives equal in cutting qualities and workmanship to any made. We also make
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FOLDING RULE AND KNIFE.
Also, Manufacturers of all kinds of
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ESTABLISHED 1852.
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WARRANTED TO BE MADE OF THE BEST MATERIAL.
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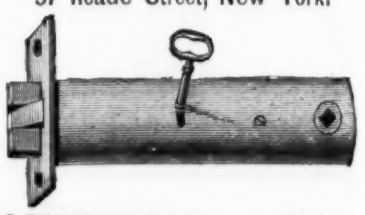
CONTINENTAL LOCKS,
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CINCINNATI INDUSTRIAL EXPOSITION.

Pig Iron and Ores.

Cincinnati is much the largest distributing point for pig iron west of the mountains, a large portion of the broad Mississippi Valley depending upon this market for its supply, which, in turn, is drawn from the furnaces in the Hanging Rock region and the iron districts of Kentucky, Tennessee, Georgia, Alabama, Missouri, Illinois, Indiana and Lake Superior. The large majority of the Hanging Rock furnaces, and those in Kentucky, Tennessee and Alabama, still use charcoal for fuel, and this, together with the nature of the ore found in this range, has given to Cincinnati iron the reputation of decided superiority over the same grades of Eastern iron. The cold blast charcoal irons of the Hanging Rock region probably have no superior in the world for car wheel purposes. Nearly all the ores in this district are red hematites, yielding from 35 to 50 per cent. iron in the furnace. Those of lower Kentucky and Tennessee are red and brown hematites, and the ores of Georgia and Alabama red and brown sedimentary and fossiliferous, the whole range yielding three prevailing grades, red short, neutral and cold short, which are obtained both by stripping and drifting.

A magnificent display of these ores and the product of different furnaces, including thirty out of the seventy-five of the Hanging Rock district, beside others from Central and Lower Kentucky, West and East Tennessee, and, indeed, all the iron regions tributary to this market, is made by Messrs. Traber & Aubery.

Among those of special interest are: Nodules of different sizes of spathic iron ore from the Iron Ridge and Maramec regions of Missouri, with amethystine quartz—real gems—in the center, which acts as a flux in smelting; neutral brown hematite ores from the valley of Virginia, found along the line of the Chesapeake and Ohio Railroad, and yielding about 50 per cent. iron; also a fine quality of yellow and red mineral paint ores from the Iron Ridge of Missouri. The whole covers a space fifty feet long by eight feet high, forming an object of very general admiration.

The early reputation of the Hanging Rock iron was in great part due to that made at the Hecla furnace, which was built in 1833, and which has ever since been making a cold blast charcoal iron from a red hematite ore of the limestone stratum of that district. The ore is of a homogeneous nature, somewhat resembling a fine grindstone, and susceptible of quite a high polish. Specimens of both ore and pig are found in the display made by Mr. Wm. Means, who makes a specialty of car wheel irons, although we find samples from nearly all the iron districts of the West and South and the Lake Superior district; also some fine specimens of black band ore from Massillon, Ohio; hematite ores from Virginia and along the C. and O. Railroad, the Chattanooga district, celebrated for its toughness in the manufacture of nails; some very tough magnetic ores from Canada and different parts of the United States. Samples of the pig metal accompany nearly all these, illustrating the kind and depth of chill where different ores are used in the mixture. He also exhibits some fine specimens of cannel coal from Davies county, Ind., and Massillon, O.; block coal from Indiana, Kentucky and Illinois; a fine specimen of lead ore from Franklin county, Mo., weighing 350 lbs., and a card of Hillman & Son's manufactured iron, giving practical tests of bar and boiler plate.

Under the division of best display of minerals the Gaylord Rolling Mill Co. show a case 11x16 feet, including gold and silver ores from California and Carolina, and a single specimen from the new Vermont mines; copper from Lake Superior and Cuba; lead from Galena, Illinois and Kentucky; tin from Missouri, the only specimen of ore in the Exposition; native sulphur from Oregon, nearly pure crystals; sulphate of magnesia from the Chrome Co.'s mines, in Maryland; gray antimony from Freiburg, Germany; manganese from Alabama; emery from Connecticut; kaolin from Brandon, Vt.; a fine variety of marbles, including granite, from California and the Rocky Mountains; fossils of the Jolliet coal fields, said to be the finest collection in the United States; and a variety of others, contrasting native and foreign of the same kind. Also, iron ores, embracing hematites from Barrow-in-Furness, England, and red and brown hematites from Alabama, Georgia, Tennessee and Missouri; magnetites from Lake Champlain, Canada, Lake Superior and Missouri; spathic ores from Switzerland and Missouri. Also, a kidney from Wayne Furnace, Tenn.—really a geode—about 3 feet high and weighing about 700 pounds.

They also exhibit a case of samples of leading patterns of bar iron of their own make, including rounds, squares, ovals, T, flange, street and coal mine rails, etc., gotten up in very neat style; beside specimen railroad and boat spikes, truck bolts, fish plates, boiler rivets, boiler heads flanged by the different makers of Cincinnati from their own iron; specimens of boiler plate prepared for testing, made in accordance with government specifications, some of which have been tested to over 95,000 lbs. tensile strength; and a very remarkable piece of ornamental iron work, perfectly representing a beautiful branch of an oak, every joint and weld, as well as leaves, including veins, etc., having been made simply with anvil, hammer and cold chisel, out of Low Moor iron.

The Burgess Steel and Iron Works, of Portsmouth, O., exhibit of their own make, specimens of boiler iron, both flanged and straight, one plate by actual test standing 82,350 lbs. tensile strength across the grain. Also homogeneous steel boiler plate, and homogeneous cast steel boiler plate, plow steel in slabs and shapes, machinery and tire steel, beside refined bar iron for gun trimmings, some fine specimens of twisted bar, a bloom hammered out under a thirty ton steam hammer to a point the size of an ordinary horse shoe nail, and specimens of hot blast car wheel iron manufactured by the Burgess process, by which it is claimed almost any hot blast, either charcoal or stone coal iron, will make a good chill.

Another firm making a fine display of manufactured iron is the Globe Rolling Mill, of Cincinnati, showing common and extra refined bar, Day & Russell's patent horse shoe bar, of which they are the manufacturers; iron flanged boiler heads; plow steel, both slabs and shapes; bronzed, bright and black wire (a specialty), the whole making a good display of goods of their own manufacture.

The manufacture of carbonized iron under several patents, by which the surface is converted into steel while the center remains tough wrought iron, has recently been commenced in Cincinnati by a company operating under the name of the Cincinnati Steel Works. The steel can be hardened or softened, it is claimed, as readily as crucible steel, and iron of any shape or quality can be carbonized to any depth, including the whole mass, at a cost much below the manufacture of crucible steel. Of their goods they exhibit steel hammers, car and carriage axles, plow steel in slabs and shapes, and common bar steel. All that is necessary is to prepare the iron in the shape desired and submit it to the carbonizing process.

There is also a good display of sheet iron made by the American Sheet and Boiler Plate Company, of Cleveland, O., including a strip ⅜x10 and 65 ft. long, and another ¼x6 and 47 ft. long; also a boiler head 94 inches in diameter, and a plate ⅜x82 in. and 12 ft. long. They manufacture about ten tons per day of galvanized sheet iron, samples of which are on exhibition, embracing sheets for a new form of tile, designed especially for mansard roofs.

The Solar Hoop Iron Works, of Pittsburgh, exhibit samples of their hoop iron of different sizes, through their agent, John F. Hazen, of Cincinnati; and Messrs. Walker, Stiles & Co. make a good display of iron measures, buckets, paint pails, &c.

Under the head of hardware, we omitted to notice two very handsome show-cases of Day & Russell's horse shoes, gotten up with the design of illustrating the different styles of shoes made, and of their rolled carbonized iron blank worked into shape.

At the west end, and reaching entirely across Grand Central Hall, in the place formerly occupied by the fountain, Messrs. Sellew & Co., of Cincinnati, have arranged a magnificent display of goods in their line, embracing a full line of tinmen's tools and machinery of improved patterns, among which we notice a patent-lever improvement by Chas. Brombacher, of N. Y., and an improved shear for clipping wire. The center of the wall, occupying a space 12x33 ft., is covered with goods from the L. & G. Manf. Co., of N. Y., surmounting which is an eagle with outspread wings, measuring about six feet from tip to tip, the whole being made of small spoons of their manufacture. There are also a great variety of their stamped and retinned goods, the stamping in one case reaching 15 in. in depth.

Another important part of this display is the goods manufactured by the Cincinnati Tin and Japan Manufacturing Co., which has become one of the important manufacturing establishments of the city. Among their goods we notice some very handsome galvanized iron water-coolers, the outside being gold burnished, toilet sets, tea caddies all sizes, coal vases and hods, some of the former being inlaid with pearl, the French filter coffee-pot, which is one of their specialties, beside a complete line of kitchen utensils.

There is also a large case of planished tin ware, all of new designs, including cushioned and fluted tops, a steak dish with enameled surface resembling porcelain, two urns of planished copper, coffee biggins, melon molds, tea sets, &c. Another show-case is filled with wire goods from the manufactory of Woods & Sherwood, of Lowell, Mass., embracing a full line of general table ware, made of ordinary wire and then tinned, by which it has all the appearance of silver goods. There are also samples of wire from the Cleveland Rolling Mill, drawn from ½ in. down to the smallest sizes; specimens of Baltimore ingot copper, which is beginning to find its way into the Western market; a full line of iron clad milk cans, made by the Iron Clad Can Co., of New York; a case of Miller, Barr & Parkins' crescent and silver tool steel, manufactured at Pittsburgh; enameled ware from Hartje, Wiley & Co., of Pittsburgh, made by a process which enables the manufacturer to give it two coats. This is done by applying the first coat with a brush which fills up all the holes there may be in the iron, and which, after being baked, is taken out and sprinkled with powdered enamel while yet hot, and immediately replaced and baked again as long as may be desired. They also exhibit a full line of goods manufactured by the Jos. Dixon Crucible Co., of New York, embracing crucibles, plumbago, stove polish and lead pencils, the latter being a new enterprise of the firm.

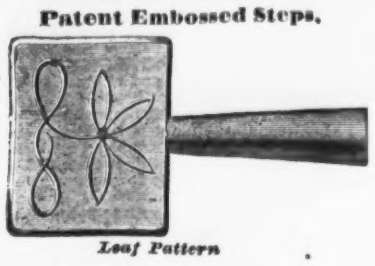
The Queen City Enameling Works also make a good display in Grand Central Hall of goods in their line, and J. H. Gray & Co., of Cincinnati, a variety of japanned water coolers, chamber sets, coal hods, &c.; Geo. D. Winchell & Co., Cincinnati, exhibit water coolers, coal vases and hods, oil cans, &c., all of their own manufacture. The Ohio Coal Hod Co., of Cincinnati, have on exhibition their coal hod with wooden bottom, designed to avoid the frequent punching of holes by the careless use of heavy coal.

(To be Continued.)

Test of Steel at the Works of Messrs. A. J. Nellis & Co., of Pittsburgh.—The piece upon which the test was made was about 6 by 6 inches and ¼ inch thick, being part of an old steel plow shovel which had been broken, and condemned as worthless, and afterward hardened by Mr. A. J. Nellis' process. One corner of this plate, to the depth of about one inch, was put into a strong vise and made fast, then a powerful man with a blacksmith's hammer struck it near the top 45 blows before it gave any evidence of cracking. We expected to see it fly at the first blow, but it showed no signs of flying. After taking it out of the vise it received 20 more blows with the hammer before it could be bent at right angles. There the test stopped. We would further say that the above test was made without there having been any preparation, as we merely made a call at their office, the test having been entirely unexpected, and was made upon an old piece of steel which we picked up at the works, and which proved to be part of an old shovel which had undergone the hardening process, more as an experiment than otherwise. The reader will very naturally suppose that this piece of steel was not tempered up to any great degree of hardness, and that it must have been of an extra quality of steel. But not so: it was tempered so high that it could not be scraped with the best quality file, and so hard as to render it susceptible of cutting glass. We presume that it would be impossible to penetrate it with the best drill in use. The result of this test and other tests, to be made at the Cincinnati Exposition with the same piece of steel, and some other pieces, show unquestionably the great importance, to plow manufacturers especially, of this product, as the steel that Nellis & Co. "are now offering" is for all kinds of agricultural implements where steel is used, and is hardened by their process. For plow shares, mould-boards, walking and riding cultivator blades, and in fact any other implement requiring a high state of polish, this steel has no equal with which we are acquainted, either in this or any other country. No team of horses under any circumstances could either bend or break the point of a plow share which has been hardened by this process, provided the steel is of fair quality. There is another very important fact connected with Nellis' process of hardening steel, which is that by the process the quality of the steel can be fully determined from the most inferior to the finest grades.—*American Manufacturer.*

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.

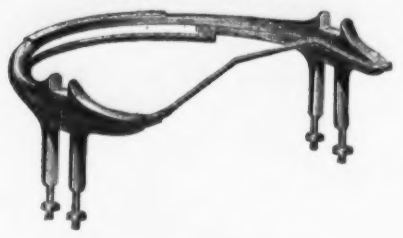


Leaf Pattern

Established 1850.

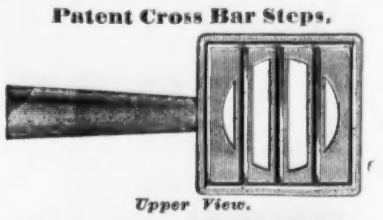
King Bolt Yokes.

No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.

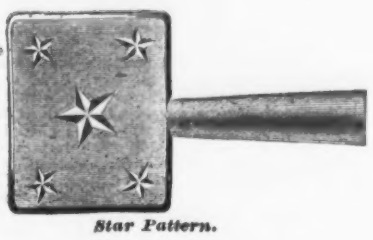
Patent Cross Bar Steps.



Upper View.

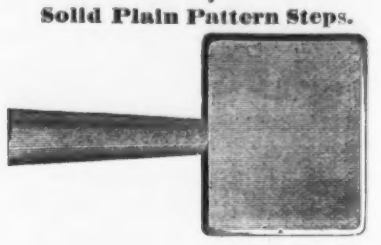
Lower View.

Star Pattern.



Smith's Improved Philadelphia Pattern Slat Irons.

Solid Plain Pattern Steps.



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Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

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Sole Manufacturers of

COVERT'S PATENT METALLIC BREAST HOLD-BACK.

Made of the best Malleable Iron. The Snap is a new invention, and superior to any yet introduced. The spring is encased in the hollow shank of the snap, preventing dirt from getting to it, and without danger of being broken or disarranged. This article has been in use five years by Farmers, Teamsters, Stage Proprietors and Horse Railroad Superintendents.

It gives good satisfaction. It is cheaper and more durable than anything of the kind in use. For sale by the Hardware Trade.

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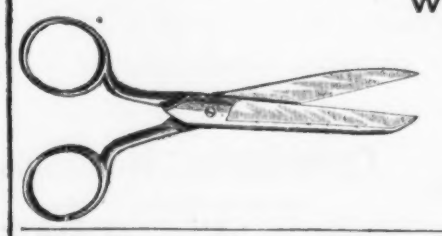
WEST MERIDEN, CONN.,



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Phila. Carriage Bolt Works,

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Carriage Bolt.

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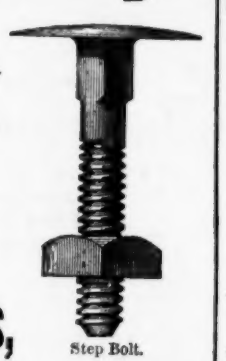

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Hand Made Axle Clips,

Skelly's Improved T-Head & Whiffletree Bolts,

Cone, Cheese, Square and Diamond Head

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EVERY BOLT AND NUT WARRANTED TRUE TO SIZE AND FIT

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Of every description, made to order.

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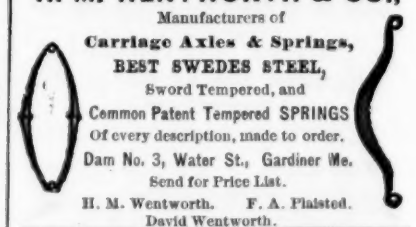

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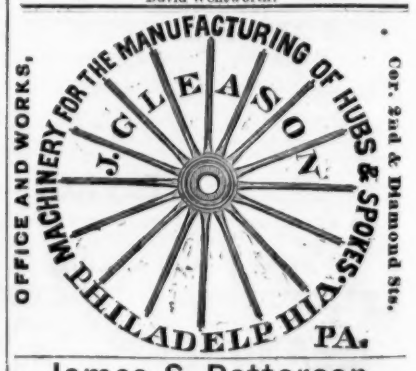

James S. Patterson,

Designer & Engraver on Wood,

21 Spruce Street, NEW YORK.

The Iron Age Directory

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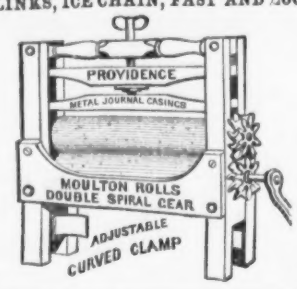

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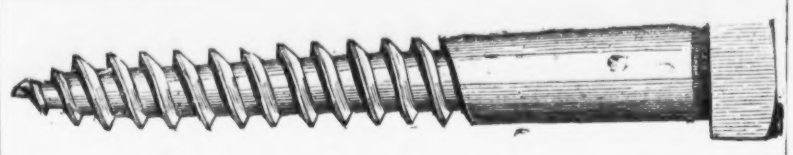

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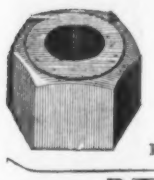

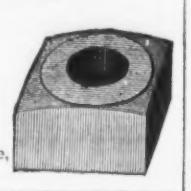

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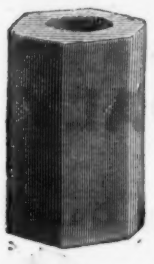

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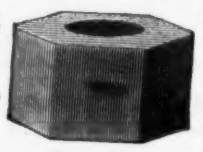

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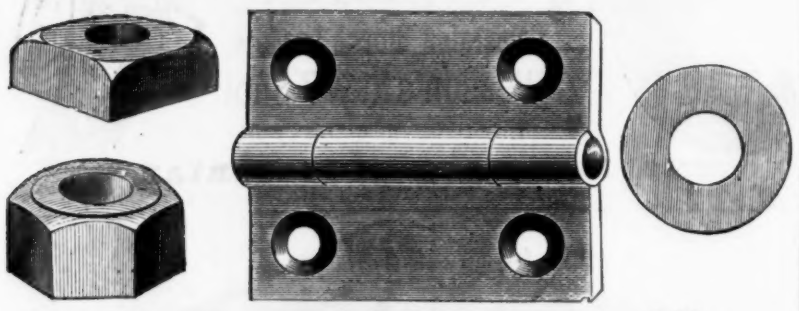

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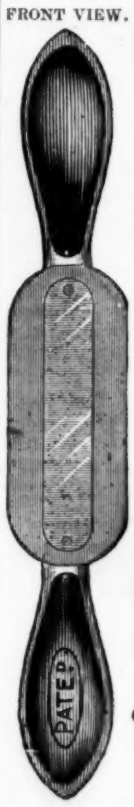

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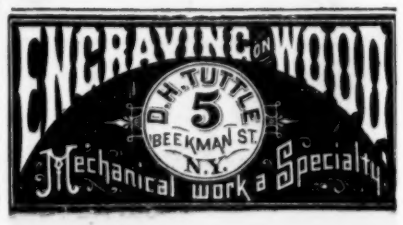

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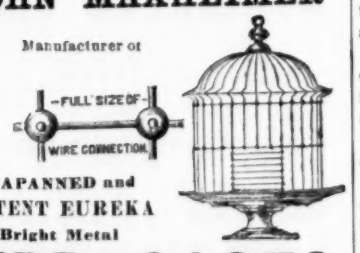

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THE FINANCIAL CRISIS.

Outline of the Events of the Past Week in Wall Street.

For the information of such of our readers as have not access to more detailed statements of the daily events since the beginning of the great panic, we have compiled the following:

The first hint of the approaching difficulties was the suspension of the New York and Oswego Midland Railroad, about three weeks ago. The cause of this suspension was the failure to raise sufficient funds by the proposed syndicate for the completion of the road to Buffalo.

The effect of this on Wednesday, combined with the failures last week, was to force down stocks from ⅛ to 7¼ per cent., creating great excitement in Wall and Broad streets.

The Midland Company did not suspend in a formal manner, but about $1,000,000 of its obligations matured within the last few weeks, a part of which the company failed to meet.

THURSDAY—SUSPENSION OF JAY COOKE & CO.

The panic thus begun on Wednesday continued the next day. Rumors of all kinds were set afloat at an early hour, and the names of several prominent houses were mentioned as being in difficulties. The excitement reached its hight when it came to be whispered that the well known house of Jay Cooke & Co. was greatly embarrassed. The rumor at first was not believed, but the truth of it was later confirmed by the reading of a formal notice of the suspension of the firm in the Gold Room at noon. The excitement on the street, the Stock Exchange and the Gold Room was intense. The immediate result of the announcement was a rapid fall in stocks, and the general impression seemed to be that other failures were inevitable.

FRIDAY—SUSPENSION OF FISK & HATCH.

The first shock of Friday morning was occasioned by the announcement that Messrs. Fisk & Hatch had suspended payment.

This firm had made heavy advances to the Central Pacific, which, however, was not the cause of their suspension, their advances to the Chesapeake & Ohio having brought them down. Both roads are completed. The Central Pacific has been the most prosperous of all the Pacific roads, having not only always paid the interest on its bonds, but having recently declared a dividend of 3 per cent. on the capital stock of about $55,000,000. On all sides the liveliest sympathy is expressed for this firm, who succumbed to the distrust which has been created against new railroad securities—those which were good suffering with the bad.

On the opening of the doors of the Union Trust Company, at Broadway and Rector streets, at 10 o'clock that morning, a large number of depositors flocked in and besieged the paying teller's desk. The crowd soon became so great that it was difficult to enter or leave the office, and several minutes were required to force a passage from the front to the rear.

As the business hours of Friday began to draw to a close, the excitement grew less, probably because those most interested were fairly worn out. The feeling, however, at 3 o'clock that afternoon, was far from good, and there were many rumors of fresh failures.

The Manhattan Bank was filled with depositors in the Union Trust Company, waiting to cash the checks given to them by the company upon the bank.

The Fourth National Bank, on which there was also a run, kept open until 3:30 p. m., and paid every demand.

There were five more suspensions announced that morning, which swelled the amount to 20.

Among the important events of the day, was the suspension of E. D. Randolph & Co.

SATURDAY—CLOSE OF THE STOCK EXCHANGE—SUSPENSION OF THE UNION TRUST COMPANY.

When the Stock Exchange opened at 10 o'clock, on Saturday, there was comparatively but little excitement, and it was believed that the prophecies of a coming calm were about to be fulfilled. Then came the news of the suspension of the Union Trust Company, and the calm was, as if by magic, converted into a storm. All the old anxiety and feverish excitement was renewed, and a panic fully equal to that of yesterday prevailed.

The intelligence of the suspension of the Commonwealth Bank, following as closely as it did upon the suspension of the Union Trust Company, increased the excitement. All legitimate business appeared for a time to be abandoned, and the most dismal forebodings were heard on all sides.

The scene in the streets was remarkable. The sidewalks were blocked with pedestrians, and the loud hum of conversation could be heard above the rattle of the street traffic.

The peremptory closing of the Stock Exchange was announced about noon, and a great rush ensued down Broad street to discover the exact cause of such an unusual proceeding.

The story of the closing of the Stock Exchange is as follows:

At about half-past 1 o'clock a report was circulated that a very important meeting of the Governing Committee was to be held. All sorts of rumors were set afloat in connection with this meeting, and the wildest and most extravagant stories passed current as gospel truth. The meeting was held at the request of the officers of the different banks, and it was generally understood that some decisive measures would be adopted to stop the panic, which was every moment becoming more unreasoning and unreasonable.

The meeting took place at 11:45 a. m., and a few minutes afterward it became known that the Stock Exchange had been peremptorily closed until further notice from the president.

THE SALE OF BONDS AT THE SUB-TREASURY.

Mr. Hillhouse, the United States Assistant Treasurer, opened proposals for the sale of $10,000,000 five-twenty bonds at noon Saturday.

But little desire was manifested to dispose of United States bonds, as people seem to be unwilling to part with this class of securities. But $2,672,650 was offered to the government, and the purchasing prices ranged from 109 to 112.

The scenes around the Stock Exchange after its close were exciting in the highest degree. Thousands of people were gathered on the sidewalks and in the roadway, and the general panic produced by the late failures and the uncertain state of the money market, resembled the effect produced by the news of the fall of Fort Sumter.

THE NATIONAL TRUST COMPANY.

The Executive Committee of the National Trust Company held a meeting on Saturday morning, and at noon the announcement of the temporary suspension of the company was made.

The officers of the banks and the Clearing House Association, at their meeting on Saturday, unanimously resolved that until the 1st of November next any bank in the Clearing House Association shall have the privilege of taking such of its good assests as may be necessary to a committee of the Clearing House, who shall issue to that bank certificates to the amount of seventy-five per cent. of the cash value of such assets; and that such certificates shall be accepted in the settlement of Clearing House differences in the place of legal tender notes.

They further resolved to pool all their legal tender notes, and make common cause against any attempt to break any of them.

A STARTLING DEFALCATION.

A report gained currency on Saturday evening, which was verified on Monday, that Charles T. Carleton, secretary of the Union Trust Company, is a defaulter to the extent of $500,000. Carleton has disappeared.

ACTION OF THE PRESIDENT—PRECAUTIONARY MEASURE OF THE SAVINGS BANKS.

President Grant and Secretary Richardson arrived in this city Saturday evening, and were on Sunday visited at the Fifth Avenue Hotel by a large number of prominent financiers. A consultation was held in regard to the course most advisable for the government during the panic in Wall street, many urging the issue of some part of the $44,000,000 reserve. Reverdy Johnson, who was among those present, is understood to have given the opinion that, though the constitutionality of this measure was questionable, it might be justified by the plea of necessity. Commodore Vanderbilt offered to deposit $10,000,000 in the city banks if the government would select them as depositories for $25,000,000 of the reserve, but the proposition was declined. The President and Secretary of the Treasury decided that the government had no legal power to interfere in the manner suggested, and finally resolved upon the purchase of an unlimited amount of five-twenties at not exceeding par in gold.

The most intense excitement prevailed all day at the Fifth Avenue Hotel, which was visited by nearly every prominent banker and broker in the city. In the evening the President and Secretary returned to Washington.

A meeting of city savings bank officers, representing 23 of the 37 banks and $200,000,000 of the $285,000,000 of deposits in such institutions, was held in the evening at the Fifth Avenue Hotel. W. H. Macy, of the Seamen's Bank, presided. The following resolution was adopted by the meeting:

"Resolved, That it is the judgment of this meeting that the rules and by-laws adopted by the savings banks, requiring notice to be given previous to payment of deposits, should be strictly adhered to."

MONDAY.

On Monday morning Wall street presented an extraordinary appearance, but the excitement was apparently of a different kind to the intense anxiety observable on Friday and Saturday, which had its origin in the condition of universal panic.

The Governing Committee of the Stock Exchange met at 9:45 o'clock and decided that the Stock Exchange should be closed until further notice. They also appointed a committee of five to confer with the Clearing House as to the situation. Nothing was done in reference to the settlement of contracts among brokers, which cannot be enforced until the Exchange opens.

The price fixed for the day at which the Treasury would take all the 5-20 bonds offered is 110·72 4-10, this irrespective of gold.

TUESDAY.

The Governing Committee of the Stock Exchange met at 9:30 o'clock in the morning, and resolved unanimously to keep the Exchange closed until further notice. A member of the committee said that this course was pursued for the reason that the banks were not thought to be sufficiently settled to render it safe to resume business after the excitement of the last few days. The committee will meet again to-morrow morning.

The members of the Gold Exchange were called to order at 10 o'clock in the morning by the president, Mr. Morris, who made a brief address, exhorting the members to be prudent and carefully avoid over-trading, after which he declared the Exchange open. Gold opened at 112, and at noon was quoted at 111¾.

The purchase of bonds at the Sub-Treasury was more active Tuesday than at any time since the offer of the government to buy was made, $1,800,000 having been bought up to 11 a. m. The price is the same as on Monday. The cashier is unable to give the amount on hand for the purchase of bonds, although the sum is ample for the purpose.

At 11:30 a. m. the total amount of bonds purchased was $2,000,000.

The amount of bonds purchased since Friday up to noon on Tuesday was $8,169,100.

At a quarter to three o'clock on Tuesday, the banking house of Henry Clews & Co., financial agents of the government, suspended payments.

An account of the events of Wednesday will be found in the financial review, which precedes the trade report. The failures on Wednesday were Clews, Habicht & Co., of London, and Howes & Macy, bankers, of this city.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending September 23, 1873:

Hardware.

Boker Hermann & Co.
Mdse. pkgs., 40
Cutlery, pkgs., 3
Barstow E. W. & Son,
Chains, cks., 1
Beam & Murray,
Cases, 6
Cutlery, cases, 2
Mdse. pkgs., 1
Brede H.
Casks, 1
Castler W. C.
Chains, cs., 1
Curley J. & Bro.
Cases, 1
Degraw, Aymer & Co
Chains, 6; cks., 4
Esty Chas.
Nails, bxs., 3
Frasse P. A. & Co.
Mdse. pkgs., 2
Casks 1
Fuller Bros.
Mdse. pkgs., 62
Cases, 4
Field A. & Co.
Packages, 35
Mdse. pkgs., 18
Anvils, 166
Chains, cks., 7
Friedman & Lauterjung
Cutlery, cases, 6
Hildick A. H.
Chains, 10; cks., 3
Anvils, 10
Hilger E. & Sons,
Mdse. pkgs., 5
Hyatt & Spencer,
Mdse. pkgs., 2
Harmar Wm. & Co.
Casks, 1
Cases, 3
Ilfelder B. & Co.
Casks, 2
Jackson R. D.
Cases, 2
King, Briggs & Co.
Cutlery, cs., 10
Lau & Garlichs,
Mdse. pkgs., 14
Merchants' Dispatch Co.
Packages, 4
Cases, 3
Moss F. W.
Flles, cks., 9
O'Connor Bros. & Co.
Nails, kegs, 4
Robbins C. & Sons,
Cases, 8
Casks, 3
Sparks J. H.
Wire, bdls., 15
Flies, pkgs, 4
Schoverling & Daly,
Mdse. pkgs., 9
Guns, cs., 3
Arms, cs., 11
Spies, Kissam & Co.
Mdse. pkgs., 1
Stratton J. F. & Co.
Packages, 15
Sawyer John.
Wire rope, coils, 2
Turnor R. A.
Packages, 15
Van Wart & McCoy,
Mdse. pkgs., 1
Cases, 2
Casks, 5
Van Nest A. R. & Co.
Packages, 4
Walsh, Coulter & Flagler,
Chains, cks., 51
Western Union Tel. Co.
Wire, lots, 493
Ward Asline,
Mdse. pkgs., 11
Wiebusch F.
Mdse. pkgs., 2
Casks, 8
Per. caps, cs., 6
Order.
Cases, 13

Iron.

Bruce & Cook,
Rods, bdls., 298
Crocker Bros.
Pig, tons, 695
Congreve Chas. & Son,
Rails, 996
Fish plates, bdls, 930
Champion & Gillett,
Rails, 897
Griswold J. A. & Co.
Pig, tons, 480
Henderson Bros.
Pig, tons, 200
Lang W. Bailey & Co.
Mdse. pkgs., 44
Bars, 491
Laughland & Co.
Haybands, bdls., 825
Lawton & Lenox,
Bale ties, lots, 179
Montell F. F. & Co.
Scrap, tons, 20
Wrought scrap, tons, 8
McBean L.
Cast, cks., 2; bbls., 5
Mallory C. H. & Co.
Scrap, cks., 14
Meyers A. & Bros.
Scrap, tons, 4
Moore's J. P. Sons,
Bundles, 189
Naylor & Co.
Fish plates, bdls., 748
Owen Thos. J. & Sons,
Scrap, tons, 150
Phelps, Dodge & Co.
Sheet, bdls., 150
Robbins C. & Son,
Boxes, 159
Sparks J. H.
Scrap, lots, 1
Sheet, bdls, 70
Seligmann J. & W. & Co.
Rails, 1841
Wilie John G. & Bro.
Cases, 22
Whitney A. R.
Flues, 1177
Bars, 71
Order
Rails, 1014
Scrap, kilos., 61,763
Bars, 13,389

Steel.

Drexel, Morgan & Co.
Rails, 1280
Hogan John.
Cases, 28
Casks, 4
Kennedy J. S. & Co.
Tires, 8
Moss F. W.
Casks, 1
Naylor & Co.
Tires, 32
Cases, 39
Prosser T. & Sons,
Bars, 851
Mdse. bdls., 169
Plersons & Co.
Bundles, 72
Sparks J. H.
Plates, 494
Slage Joseph.
Mdse. pkgs., 11
Schweitzer Mfg. Co.
Cases, 1
Seligmann J. & W. & Co.
Rails, 481
Tyng & Co.
Bundles, 7
Cases, 2
Vose, Dinsmore & Co.
Rails, 502
Wardlow W. C.
Bundles, 411
Cases, 34
Order.
Cases, 1
Bundles, 925

Metals.

Brown Bros. & Co.
Plumbago, bbls., 3267
Bruce & Cook,
Tin plates, bxs., 1379
Cort N. L. & Co.
Terne plates, bxs, 185
Goodwin & Rice,
Tin plates, bxs., 544
Grinnell, Minturn & Co.
Sheathing metal, cs., 40
Harley Geo.
Scrap, pkgs., 27
Hart Lucius & Co.
Tin, ingots, 150
Hunter W. B. & Co.
Tin, bxs., 1647
Jones & Laughlin,
Tea lead, casks, 6; bbls., 8
Maillard H.
Tin, cs., 3
Montell & Bartow,
Scrap, pkgs., 5
Montell F. F. & Son,
Scrap, pkgs, 45
McBean L.
Brass, lbs., 7; cks., 2
Scrap, pkgs., 10
Phelps, Dodge & Co.
Tin plates, bxs., 17,388
Tin, ingots, 120
Sparks J. H.
Copper, ingots, 115
Tin, bxs., 283
Snow & Son,
Tin, bxs., 100
Societe de Credit Suisse,
Tin plates, bxs., 2678
Tin, ingots, 268
Bar tin, bbls., 15
Willet, Pollard & Co.
Sheathing metal, cs., 20
Order.
Tin plates, bxs., 4158
Lead, pigs, 1642
Scrap, copper, lbs., 7691
Plumbago, bbls., 468
Black lead, cks., 67
Tin, slabs, 1149

Sale of Scranton Coal—Slight Decline in Prices.

The regular monthly auction sale of Scranton coal took place at noon yesterday at the salesroom of the Delaware, Lackawanna & Western Railroad Company, No. 26 Exchange Place. Ninety thousand tons were offered on the usual terms and conditions, which were read by the auctioneer. The attendance was very much smaller than usual, and the sales were confined to a very few buyers, who purchased large quantities.

There was an average decline on steamboat of 6¼ cents per ton, on egg of 5 cents per ton, on grate of 1¼ cents per ton, on chestnut of 5 cents per ton. On stove coal there was an average advance of 1¼ cents per ton. The decline in prices is generally attributed to the condition of the money market.

The following are the prices at this sale, compared with those obtained at the sale last month:

	Tons.	August 27.	Sept. 24.
Lump ...	None	None.	None.
St'mboat	10,000	— @ 4·87½	$4·80 @ 4·82½
Grate....	20,000	$5·00 @ 5·05	5·00 @ 5·02½
Egg	12,000	5·37½ @ 5·40	5·32½ @ 5·35
Stove....	26,000	— @ 5·45	5·45 @ 5·47½
Chestnut	13,000	— @ 4·77½	4·70 @ 4·72½
	90,000		

The Paterson Locomotive Works.—Four hundred and fifteen more men are to be discharged from the Rogers Locomotive Works on Thursday, making one thousand men discharged this week; or two-thirds of the whole force of the the establishment. The Danforth and the Grant Works have not as yet decided to discharge any of their workmen. The order for the discharge of the Rogers Works employes was based on the countermanding of a contract for 60 locomotives which had been awarded to the company. It is well known that the company had received orders from the Missouri, Kansas and Pacific, Mississippi Central, and the Louisville and Nashville Railroads, but they refuse to make public the name af the company which has countermanded the order. The men who were discharged earned $10,000 per week on the average, and it is expected that much suffering will be felt among them on account of the movement, which will also effect business throughout the whole city. The employes of other shops are still retained, and it is said that they have enough work to occupy hem through the winter.

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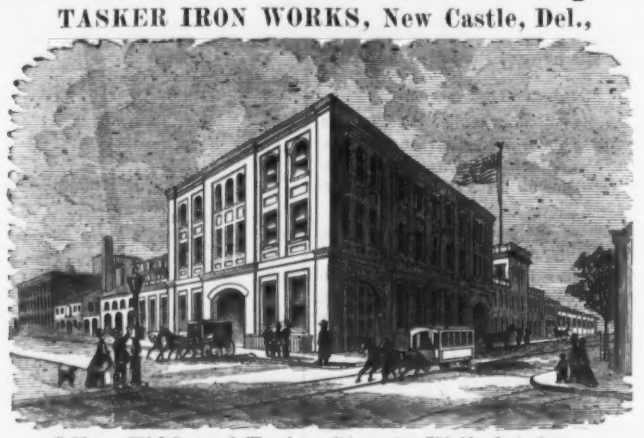

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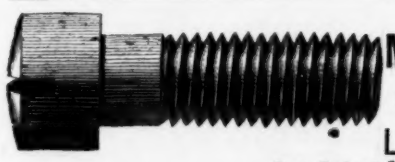

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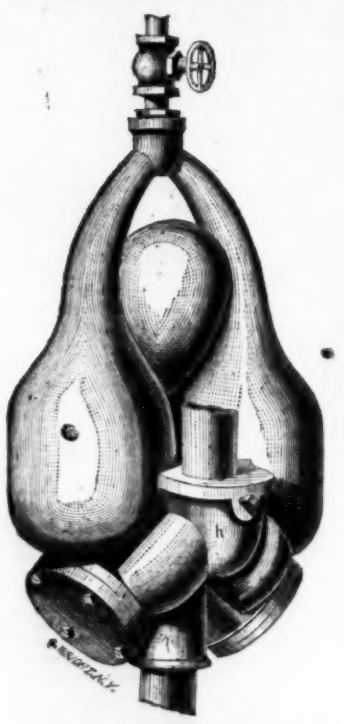

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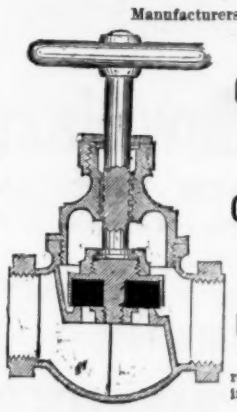

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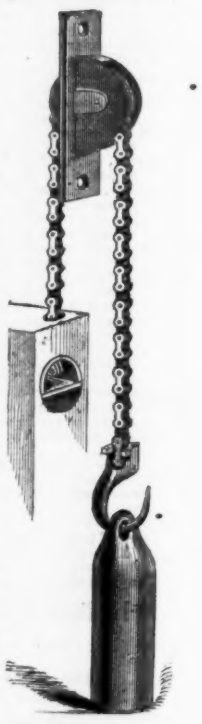

And patented attachments for same, for suspending windows, from 100 to 1500 lbs. Sashes can be suspended with my Chain and attachments in a shorter time and with less trouble than by using the ordinary common cord. I am now offering the Chain and fastenings cheaper than any other in the market. Also manufacturer of the MORTON & BREMNER'S Straight and Circular Spring Balances. Established in 1842.

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BUILDERS' HARDWARE,

Pure Bronzed Metal and Hand-Plated Knobs, Hinges, &c.,

Agents for Gautier's Black Lead Crucibles.

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Chain and Pulley for Heavy Sash

F. & L. MANY & MARSHALL,

48 Warren Street, NEW YORK,

Manufacturers of every description of

HAASE'S PATENTS.

Patents. Hose Shield,

FLOOR & DOOR CLAMP,

And Eight Sizes *Ratchets.*

John A. Haase,

S. 116 Vanhorn St. Phila. Pa.

[SEND FOR CIRCULARS.]

CAUTION.

We learn that certain parties are making and selling **Second quality and inferior** Planes stamped, **"A. C. Bartlett's Ohio Planes."** There is no such manufacturer of planes. The object is obvious, as our planes have been known as **OHIO** planes for the past 25 years. First quality planes of our make are stamped **OHIO TOOL CO., COLUMBUS**

September 17, 1873.

Improvement in Railway Axles.

BY JAMES A. WHITNEY, M. E.

That numerous casualities arise from the imperfection of railway axles is believed by the general public, and known by railway men. Manifestly there are but two ways of diminishing accidents from this cause: one, the adoption of better material in manufacture and more severe strain in testing; the other, the employment of new methods of construction, which, with a given weight, quality and kind of metal, will secure increased tepsile and crushing strength, combined with greater resistance to molecular change. The first step forward in the first would be the introduction to the axle-shapes of methods well known in other departments of manufacture, where articles subjected to severe strain are turned out. The closest imitation of the famous Damascus cimetars, which "bent double, point to hilt," have been made by combining in one bar iron strands themselves formed by twisting and welding together rods of different kinds of iron. The well known stub and twist gun barrel is another example of the same principle which, to recur again to sword blades, finds another illustration in the modern practice of Turkish sword makers, who, as travelers allege, find the material for their best blades in old hoop iron. The inference is plain enough. A cylindrical shaft formed of firmly welded and intertwisted bars of varied and first-class kinds of iron would show far less tendency to sudden fracture than one made of average iron from the bloom, to say nothing in the way of comparison of those made from ill assorted scraps, such as, on the score of cheapness, it is said some railroad companies affect. There lies, indeed, in the judicious combination of different materials, a possible though occult advantage in greater resistance to the tendency to granulation or crystillization, from repeated vibration of the fibers of the metal. This idea, in a broader sense, was made the basis of one of Bessemer's patents, dated twenty years ago, and of course now public property, and open to improvement or adoption by any who choose. It must be borne in mind, however, that no record appears of its trial in practice, and its possible utility rests only upon plausible conjecture. The invention is set forth in the "abridgements" somewhat in detail as follows: "The invention consists in combining two or more metals together in the construction of axles, the vibrating qualities of such metals being different, so that all tendency to vibrate in the combined mass is nearly or quite destroyed by their mutual counteraction. An axle may be formed (for example) and galvanized or tinned from end to end, with the exceptions of the parts forming the bearings or journals, the different metals being then united by heat; or a hollow iron axle may be lined or filled with a different metal; or an iron axle may be made hollow and then both filled and coated with metal of a different quality. And in placing wheels upon such axles the opening of the nave is made of such size as to leave a small space around the axle, which space is then filled with some metal different in its vibratory properties from iron, which is run into the space in a fluid state, the wheel having been previously heated, and consequently gripping the metal firmly when it cools." The last mentioned feature of this invention seems, to all intents and purposes, to be fulfilled incidentally by the wood and paper applied in the wheels of palace and other cars on some of our most progressive roads. The means, however, set forth for uniting one metal to another in the fabrication of the axles is wholly inadequate. To fasten steel to iron, for instance, in such manner that it will undergo subsequent manufacturing manipulation, and withstand jar, strain and vibration without separating, is a difficult matter, and one that has baffled many a promising scheme for hard surfacing rails. The various plans for combination rails may, however, furnish valuable hints for experiments looking to the production of an efficient compound axle on this old system of Mr. Bessemer.

Of numerous other projected ways for combining steel and iron, few or none are worthy of particular mention. They have comprised "the manufacture of a solid iron axle incased with steel, this being accomplished by drawing a tube of steel upon an iron axle, and then welding or contracting it upon the axle" (McConnell, 1861).

There have not been wanting numerous forms of the hollow axle designed, not for the usual function, but to provide against damage in case of the breakage of the usual axle. The first of these appears to have been devised by Robert Stephenson in 1831. The alleged improvement is described with a curious confusion of the term "axis," with "axle," as consisting in "fixing two of the carriage wheels fast upon the extreme end of a long, hollow or tubular axis, within which a solid central axis is inserted, extending through all the length of the hollow, and projecting out sufficiently beyond each end of the hollow axis to enable the weight of the carriage to be supported upon the projecting ends of the solid central axis, around which the hollow axis turns, together with the two wheels which are both fastened as aforesaid upon the ends of the hollow axis." Stepenson also proposed to place oil within the hollow axis to serve as a perpetual lubricant, a notion revived thirty-two years later by an inventor scarcely less eminent as a mechanical engineer, Wm. Brydges Adams, whose death, at a ripe old age, was chronicled but a year or two ago. Adams' plan was, if anything, more crude than its prototype, for the hollow axle was to be made by extending the wheel-bosses inward until they met midway between the wheels. He also suggested the filling of the space between the solid and hollow axle with water which, presumably, might in some degree cool the bearings. But the whole system of safety axles provided in this manner is too clumsy and costly ever to meet with much favor, and is noticed mainly from the fact that some of the minds greatest in mechanical acquirements have not disdained to strive for its introduction.

Another and quite distinct form of the hollow axle is that divided or swivelled to permit the two ends, with their attached wheels, to turn independently to facilitate the turning of short curves. Little can be hoped for from these, as the nicety required in their adjustment must necessarily constitute a source of continual derangement, and for this no possible remedy or preventive can be found. A substitute for such devices has been proposed in the form of long bosses on the wheels, turning on fixed axles, very much after the fashion of wheels on ordinary vehicles. In some cases equivalents were to be provided in the form of "short, hollow axles," affixed to the bosses; but the greater frictional surface of the bearings thus provided, the difficulties of proper lubrication, far trandescending those with ordinary journals, and the "wabbling" of the wheels, pretty sure to occur from the wear of the bearings, would furnish objections sufficient to shut off from the plan the possibility of favorable recognition at the hands of railway men. A fair condsideration of the subject, therefore, from two or three standpoints, leads to the conclusion that any real improvement in car axles must be found rather in quality of material and methods of fabrication, although, for some reasons, a simple hollow axle, if capable of being cheaply manufactured, would be preferable to the solid axle now in universal use, and likely to hold its own for a long time to come.

On the Economical Preparation of Iron for the Danks' Puddling Furnace.*

By Mr. CHARLES WOOD, Engineer, Tees Ironworks, Middlesbrough.

It will be fresh in the minds of the members of this Institute that at the meeting at Dudley, in August, 1871, in the session of our worthy ex-president, that Mr. Danks brought before your notice his revolving puddling furnace. The very satisfactory statements made by Mr. Danks on that occasion resulted in a commission being sent out by this Institute to America to examine into the whole question, and the very able report of the scientific investigation of those gentlemen is well known and appreciated by all those who are in any way connected with the iron trade. Some of the few defects pointed out by these gentlemen are the very large quantity of coal consumed per ton of puddled bar produced, and the destruction to the lining of the furnace when charging with pig iron. This destruction arises from two causes. Firstly, the pigs are generally broken in halves, and are put into the rotary furnaces in charges of about half a ton each. The melting of this pig iron is the most serious item to contend against; the pigs lie in the bottom of the furnace impenetrable to the heat; the rotary furnace cannot be set in motion except with the greatest caution, for fear of the pigs rolling over and knocking the lining to pieces; even with the greatest care half an hour is often spent in preparing the lining for the next charge. Secondly, there is also considerable damage done to the lining of the furnace and the iron produced by the presence of a large quantity of silica, which is introduced with the pig iron in the shape of sand. To meet these difficulties the American commissioners proposed to reduce the iron to a molten state before introducing it into the furnace, and no doubt at first sight this appears to be the right thing, but somehow or other, from causes I am unable to explain— not having had sufficient practical experience—the yield of the iron and the quality is not as good as when the cold iron is charged; perhaps it may in some way be accounted for by the fact that the molten iron does not take up so much from the fettling, and, again, the molten iron not being so long in contact with the fettling may not part with so much of its impurities. Then, again, there is the serious cost of melting by the cupola, which cannot be done much under the following sums

	s.	d.
Waste of iron in melting 4 per cent	4	0
Carrying metal	0	6
Wear and tear of cupola and tools	0	3
Coals and engine power	1	7
Charging and working cupola	1	5
Coke for melting, including charging 3¼ cwt. at 38/	6	7
Limestone	0	1
	14	5

Making 14/5 per ton before it goes into the rotary furnace. These figures are obtained from a cupola running 40 tons per day, and are a fair average cost. It will, therefore, be seen that although the cupola process is undoubtedly a saving over the system of melting the pigs in the rotary furnace, yet that it is an imperfect and very costly process, and it is with an idea that I have succeeded in overcoming all these difficulties that I have the pleasure of reading this short paper before you. I had the honor at the last meeting of reading before you a paper on the utilization of blast furnace slag, and I then showed you my models and systems of granulating the slag as it flowed from the furnace, as well as samples showing the perfect manner in which the granulating and cooling is effected. These samples, for the information of the gentlemen here present, I have pleasure in showing again on a small scale. The perfect granulating action of the machine induced me to try its effects upon iron, and I ran the iron straight out of the furnace into the machine, and produced the sample of iron on the table before you; the application of this to the Danks furnace at once suggested itself, and at Mr. Danks' request I tried a larger quantity; this has been since tried in one of the rotary furnaces at work at the Tees Side Ironworks, Middlesbrough, with the greatest success. The charges are brought out in about 35 minutes, the quality of the iron is very superior, and the yield quite as good as if pigs had been put in, whilst the lining of the furnace is little the worse. It will be seen that by charging the furnace with the granulated iron the machine can be set revolving at once, thus exposing the whole surface of the iron to the heat which is at once taken up, and the iron is melted in an incredibly short time. The iron runs from the furnace into a big ladle or dam, whence it is tapped out—in the same way as from a cupola—in a small stream into the machine, so as to keep it under control and avoid all possibility of explosion. A sample of iron is taken from each tapping to show the quality of the iron in its granulated state, the iron is delivered by the same machine at one operation into iron trucks, whence it can be delivered direct to the pudding furnace. The machine is made in a shape not unlike a rotary puddler, only much larger, being from 12ft. to 14ft. in diameter, and having sides, so as to enable it to contain between 3 ft. and 4 ft. of water. This cylinder is kept in motion by a small steam engine, and will make from five to six revolutions per minute, according to the size the iron is required to be granulated. There are a series of buckets or agitators, which, being fixed to the cylinder, rotate with it. These buckets or agitators, passing through the water, keep the water in a violent state of motion—the water having a tendancy always to rush to the bottom—but meeting with the buckets, it rolls over in a violent manner. Into this water the small stream of molten iron is run, and is scattered as it were in the body of the water, where it is held in suspense sufficiently long to prevent its touching the plates at the bottom whilst in a liquid state, and thus avoids all possibility of explosion. On this point alone rests the failure of all former attempts to granulate iron in water.

The buckets or agitators also elevate the granulated iron to the top of the machine, where it drops into a spout, and thence into railway trucks or wagons holding about a charge for the puddling furnace. In conclusion, I would wish it to be understood that I do not claim the invention of granulating iron as new, as, to my knowledge, it has been more or less tried during the past twenty years; but what I do claim is the very simple and inexpensive mode of producing granulated iron, and one which will at once offer itself as a practical solution of the difficulties before named, and which is calculated to effect a saving of at least ten shillings per ton on the finished iron.

* Read before the Iron and Steel Institute.

A casting of great size is about to be made at St. Louis. It is an immense iron bed plate, 18 feet long, 9 feet wide, and 7½ inches thick, weighing between 44,000 and 45,000 pounds. It is made for the Plattin Creek Plate Glass Company, and it will be used as the bed upon which the molten glass will be rolled out into smooth plates.

Special Notices.

Founder Wanted.

Wanted a founder for a charcoal furnace in the State of Virginia. Must be accustomed to making car wheel iron from brown hematite ores, with warm blast. Address, stating price and references,

"K," Office of The Iron Age,
No. 10 Warren St., N. Y.

Wanted,

By a young man willing to work, a situation as clerk or assistant in a hardware manufacturing company or iron works. Would prefer a place out of New York. Can give unexceptional references as to ability and character. Expectations as to salary moderate. Address,

J. L. MOORE,
P. O Box, 5555, N. Y.

To Iron Manufacturers.

A young man, a thorough accountant, desires a situation. Has had experience as clerk of an Iron Furnace. Can give the best of reference.

Address **"IRON," 241 4th Ave.**

STERLING
IRON & RAILWAY CO.

MAKERS OF

STERLING
ANTHRACITE PIG IRON

FOR FORGE AND FOUNDRY USE.

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A Weekly Illustrated Journal, edited by **W. H. MAW and JAMES DREDGE.**

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All the important details of the buildings and novel machinery at the great Vienna Exposition will be illustrated and described in *Engineering* the current year; and this, with illustrations of all the larger American engineering structures, will render it invaluable to every American Engineer, Architect, Iron Master and Machinist.

The best medium for advertising American Machinery to the attention of European capitalists.

Send for specimen copy, free.

NEW YORK, July 1, 1873.

THE ATTENTION OF MANUFACTURERS AND business men is called to the natural advantages of Bristol, Bucks County, Pennsylvania, for a manufacturing site, situate on the River Delaware, with a river front of over one mile, navigable for vessels drawing 15 feet water, 18 miles from Philadelphia, on the line of the New Jersey Division, Pennsylvania Railroad, between Philadelphia and New York and at the terminus of the Delaware Division of the Lehigh Canal, by which coal and iron are brought to our town cheaper than at any other point between New York and Philadelphia.

Bristol is noted as being a very healthy place, with cheap homes and low rents, good public and private schools, six churches of different denominations, and several manufacturing establishments already established. It contains a population of over 5000, and is constantly increasing in size and population.

Believing that Bristol possesses advantages that few other towns possess, and that the attention of manufacturers need only be diverted in this direction, the Burgess and Council have enacted the following ordinance, viz.:

Be it ordained and enacted, by the Burgess and Council of the borough of Bristol, and it is hereby ordained and enacted by the authority of the same, That all manufactories which shall be erected within the borough of Bristol, during the period of ten years from and after the passage of this ordinance, shall for and during said period be exempted from the payment of borough tax.

Enacted into an ordinance at the Council Chamber, this fourteenth day of July, A. D. 1873.

CHARLES E. SCOTT, Burgess.
Attest: J. WESLEY WRIGHT, Clerk.
BRISTOL, Pa., July 21, 1873

R. T. HAZELL, AUCTIONEER.

By R. T. Hazell & Co.,

Store No. 118 Chambers Street.

Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

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A Pattern Maker in Metals

For fine castings, wants to get a situation. He is reliable and perfectly competent.

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IVES & ALLEN, Montreal, P. Q.

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Agents for American manufacturers of Hardware and Machinery. **Consignments Solicited.**

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FOR TRANSPORTATION OF

Lumber, Coal, Iron,

and all heavy freight, between

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180 Broadway, WEST TROY,
28 Lumber District, ALBANY,
19 Coenties Slip, N. Y. CITY.

Translations and Condensations.

The undersigned, commercial Editor of *El Cronista* the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin*, has made it a specialty for years past to translate industrial matter, with the strictest adherence to the technical wording, from and into English, German, Spanish and French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity.

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For Sale or to Let.—The McHaffie Steel Co.'s Works, at Lamokin, on the P. W. & B. Railroad, at its junction with the Baltimore Central, comprising Foundry, Annealing Furnaces, Machine, Blacksmiths' and Carpenters' Shops, &c., &c. These Works are most eligibly located, and with ample facilities for doing a large business. Parties desiring such property are requested to apply in person at the Works, or by letter addressed to The McHaffie Steel Co.," Chester, Delaware Co., Pa.

Special Notices.

Donkey Engine & Boiler Wanted,

Cheap for cash, in good order, by

OAKDALE IRON CO.,
Kingston, Roane Co., Tenn.

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Small, in good order, Wanted, cheap for cash, by

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OAKDALE IRON CO.,
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Mining Superintendent Wanted,

(Coal and Iron Ore). Must be practical, experienced and well recommended. Write fully, stating salary wanted. A permanent position to the right man.

OAKDALE IRON CO.,
Kingston, Roane Co., Tenn.

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BOSTON, Nov., 20, 1872

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Blacksmiths' & Pattern Makers' Tools.

Also a large and varied assortment of patterns, more extensive than usually found. They also offer Patterns and Special Tools for the manufacture among others, of the following specialties, which equal, if not superior, to any made:

Hangers, Pulleys and Couplings.
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Many of these specialties would make a business, and are worthy the attention of machine shops and foundries looking for business. Address

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The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

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There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. *If not sold in a reasonable time it will be for Rent.*

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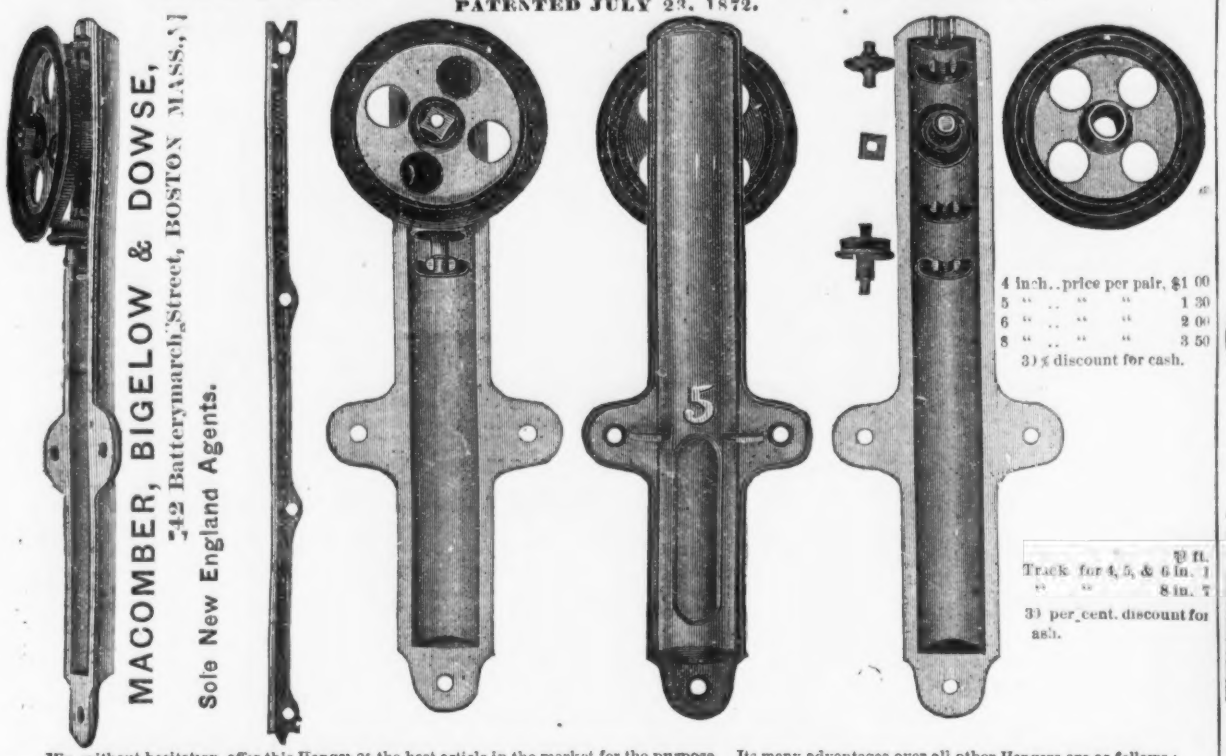

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Sole New England Agents.

4 inch..price per pair,	$1 00
5 " .. " "	1 30
6 " .. " "	2 00
8 " .. " "	3 50

30 % discount for cash.

	Per ft.
Track for 4, 5, & 6 in.	1
" " 8 in.	2

30 per cent. discount for cash.

We, without hesitation, offer this Hanger as the best article in the market for the purpose. Its many advantages over all other Hangers are as follows:
1st.—It is more than **double as strong** as any other Hanger, owing to its semi-cylindrical or curved back.
2nd.—It is provided with a friction wheel at the top of the Case, which bears against the rear or outside of the sheaves, and prevents it from **leaning outward** and causing it to **RUN TRUE**, a feature not attained in any other Hanger.
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5th.—**IT CAN NEVER RUN OFF THE TRACK.**
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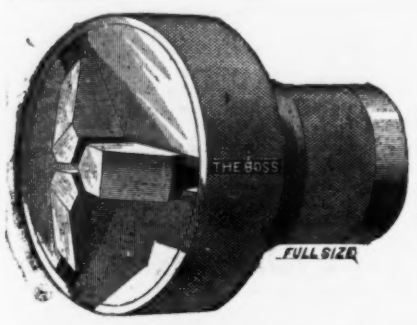
Also Agents for the CONNECTICUT CUTLERY CO., of Naugatuck, Conn., and keep on hand a complete assortment of their goods.



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is warranted to be the best and most perfect made Chuck in use. It holds from 0 to three-eighths inch, and is truly the Boss Chuck. Every piece is made of Forged Steel, and finished to a Gauge. Give it a trial and you will be satisfied; if not, return it at my expense, and your money will be refunded. Address

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Manufacturer of all kinds of Lathe Chucks,

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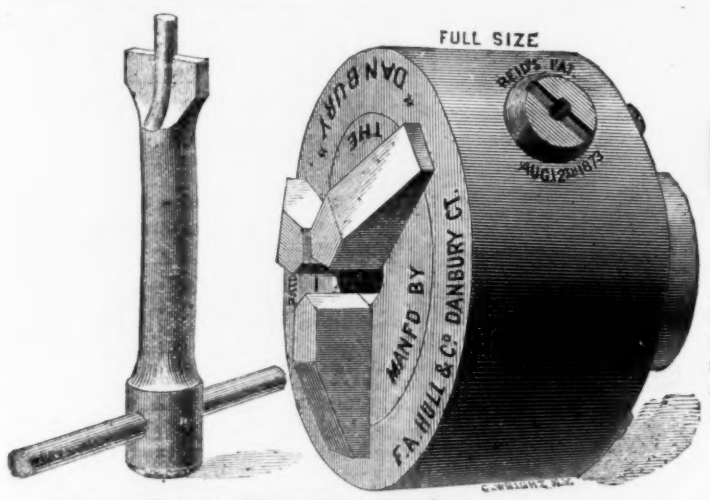

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UNIVERSAL JAW

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C. H. Reid's Patent August 12, 1873.

Most POWERFUL Chuck made. Holds drills from 0 to ⅝, and by turning down shanks to ½, will hold—without slipping in the *most trying work*—up to one inch, inclusive. Its action is *direct*, quick and positive. Mechanical movement is such that it cannot *clog*, *set*, or in *any way* "get out of order." Has now been in constant use six months, working *perfectly*. Every Chuck is sold on *full warrant*, to be returned and cash refunded if not entirely satisfactory. Address

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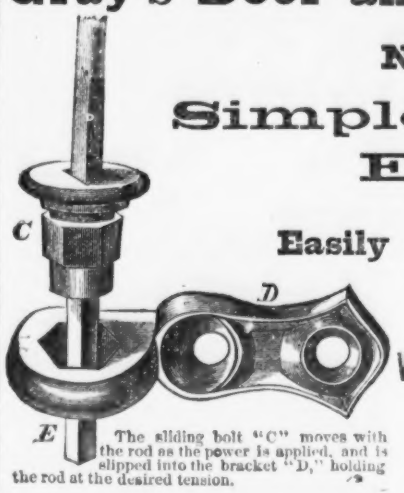

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CORRESPONDENCE.

PHILADELPHIA, Sept. 22, 1873.

The tremendous excitement which has existed in business circles here during the latter half of the week past has completely overrun everything in the way of trade news or local gossip. With the street in a turmoil, and finances muddled beyond comprehension, one seeks in vain for matter of interest apart from the all absorbing topic. As to this subject alone will the minds of men revert at this moment, it is best to give what we have to contribute to the general information to it. Taking into consideration the fact that Philadelphia was the headquarters of the firm which first yielded to the financial stringency, and the home of the railroad which caused the disaster, it is satisfactory to note that up to this writing there has been no failure of any banks save the initial one of Jay Cooke, and one small affair, the Union Banking Company, nor, which is the more wonderful, of one mercantile, manufacturing, or other firm engaged in legitimate business. The insanity which prompts men to sacrifice shares in prosperous and profitable corporations, which have lost nothing in intrinsic value, because one banker or broker cannot meet his engagements, has been short lived here. The promptness with which every demand has been met by our leading banks has restored confidence in a great measure, while the solvency of our mercantile community has been thoroughly demonstrated. It may savor of hypercriticism to include a house like that of Jay Cooke & Co. with those outside of the pale of legitimate business, and yet the facts bear it out. Here was a firm controling immense capital, of unbounded credit, receiving deposits from all classes, engaged in carrying to completion the building of a railroad through a country yet to be generally developed to furnish it traffic, and upon the chance of borrowing the money wherewith to do it. When we adopted the bond system of building railroad we only enforced the truth of the old adage concerning "he who goes a borrowing," &c. To popularize the promises to pay of a nation among its own people, whose personal salvation depended upon their national integrity, was one thing; to repeat the performance, with a purely speculative enterprise, was another. No portion of the country yet demanded or offered opportunity for a railroad without the possibility existing of obtaining the required capital by stock subscription. The whole bond system has been pernicious, injurious alike in its effects upon the seller and purchaser, and resulting in loss all around; to the material men, as witness the burden laid upon many of our rail mills; to the purchaser, because of delayed interest; to the road, because inviting extravagance in construction and equipment and management. It is safely stated that had it never been adopted the iron trade alone of the United States would have been 25 per cent. richer, and the number of dividend paying railroads greatly more numerous to-day. Such a suspension is, however, a national calamity, and the error has been quite as much that of the people who took the securities as of those who offered them. And in this category of those to blame comes prominently forth the management of the Treasury Department for the past two years.

Just a year ago a meeting was held in the office of a leading manufacturer of Pittsburgh who has been noted for his sound business views and correct judgment, at which several manufacturers, bank presidents and merchants were present, and at which the question of the stringency of money was discussed, and the evident inability of the issue of currency to supply the wants of commerce. The universal expression of opinion there was in favor of urging the re-issue of such portion of the retired currency above mentioned as should give the desired relief. The wires were resorted to, and from all the manufacturing points East and West came indorsements of the policy. Secretary Boutwell was appealed to, and while he was considering the matter it became public, and a remonstrance in the strongest terms came from Wall street—from the very bankers and brokers who now are storming the administration for the same currency. Had the manufacturers of Pennsylvania and the West been heeded at that time the present difficulty would, in all probability, have been avoided. Of course, the usual arguments against inflation, and all that theory, may be adduced against this, but it is one thing to give a discount to a country store-keeper, and another to provide a nation growing, as our census shows the American people to be, with a circulating medium. The policy that has ruled the Treasury for the past few years has been evidently upon the former scale.

THAT ONE HUNDRED TONS OF BARS.

Had it not been for the panic, the subject of most moment in trade circles for the week would have been the sale of one hundred tons of American bars at £11. 10/, cabled on Wednesday. Like most weak inventions of the enemy, this bore upon its face the evidence of its falsity. With iron of like grade and quality selling for £14, it was not probable that either shipper or consignee would have made a sale so much under the local market, or netting a loss of full $20 per ton to the shipper. When the American ironmaster ships iron to England at such a loss, Macaulay's New Zealander will be round London Bridge. But the way the secular press congratulated the trade was refreshing. With scarcely an exception all the papers heralded the triumph of American manufactures, in a sale which really would not pay for the ore and coal expended on the iron, leaving the questions of labor and profit on one side. As was foreshadowed in a previous letter, this very course is producing its legitimate fruit. The *World* has opened the free trade campaign, and the articles of that journal carry weight because they are more ably written than most of the replies to them, and urges that the tariff "has served the purpose of the Pennsylvania founders and forgers, and no longer brings revenue to the treasury or protection to the American manufacturer." It is a question, therefore, whether the iron manufacturers have not grave cause of complaint against that portion of the press of the country pretending to support them. And why is it that the woolen manufacturer, or he who makes silk, or sugar, or any of the thousand other products, is let alone while the iron man must be dragged to the fore, the actual cost of his product itemized as well as that of his raw material, and be assured that he is realizing unheard of profit, when he is seriously considering the necessity of blowing out his furnace or shutting down his mill. The iron trade has ably edited and honestly conducted journals, devoted to its interests, and where they have been such, they have been well supported. The duty of the newspaper press is to furnish the current facts of the day, as that of the minister of the gospel is to furnish the truths of religion as stated in holy writ, and the less the readers of the one, or the hearers of the other, have to do with individual opinions in editorials or sermons, the better for all concerned! Nevertheless, if the friends of protection do not stir themselves more energetically, there will be sharp work at Washington next winter.

LOCAL GOSSIP.

So much of my space has been given to the bugbears of the hour, that little remains to devote to ourselves. The meeting of the National Board of Steam Navigation, referred to in my last, was held here during the week, and well attended. The executive committee reported as to action in regard to existing laws, showing the great injustice done the interest thereby. The general expression of opinion was hostile to the practice of taxing steamboat owners by forcing patented appliances upon them. The worthless character of the present inspection certificate was shown, and the general determination expressed to urge on Congress the absolute necessity of relief. The delegates were taken on an excursion to the various shipyards on the Delaware, and, after a short session on their return, the convention adjourned. One of the objects of especial interest shown them was the launch of the Columbus, the largest iron coasting steamer yet built in this country. This vessel was built for Thomas Clyde & Co., by Messrs. Cramp & Sons, and is intended for their New York and Havana line. She is 2000 tons burden, 280 feet long, 23 feet hold, and 35 feet beam, supplied with the compound condensing engine, and in every way a superior ship. There are quite a number of interesting improvements remaining to be noticed, but my space forbids. One matter occurs of moment. The *Engineer*, of latest date, refers to the introduction of the manufacture of spiegeleisen in England as of great importance, owing to the high price and great demand there for it. We are importing largely and in growing ratio of this article, which is reaching exorbitant prices, while there is no reason we should not manufacture it, both the ores and the skill to do it existing here. This subject has been several times brought before my notice hitherto by an expert in the manufacture of this now much used substance, and he has frequently expressed surprise that it was not undertaken. Some of our blast furnace owners now complaining of the low price of their product, should turn their attention to this subject, and be the first to supply the demand with American spiegel.

Lightning Conductors.

About a century has elapsed since the first practical idea of a lightning conductor was suggested. Of recent years their value has been more or less appreciated, but, with the exception of their application to the preservation of shipping, little has been done in the extension of their use. Where employed they may be or are considered much in the light of a talisman. This remark of course applies to erections on land, in which, as we shall subsequently show, little or no heed has been paid to the teachings of science. For all practical purposes we may consider the lightning conductors of the present day, on land, as simple invitations of electricity to spread evil. Perhaps this idea has prevailed largely among architects, and has so prevented their more frequent use. We have made it a matter of remark in tours in all parts of the kingdom during the last two years, that not one tall erection (such as a factory chimney or church steeple), in a hundred, is so protected. Suggesting to the manager of a large public company, during the erection of a chimney about 180 feet high, the desirability of a lightning conductor, he replied that a neighboring shaft had not been "struck," during the last thirty years, and therefore he could not see the necessity.

Theoretically, almost every ordinary house should be safe from much danger; but experience proves this not to be the fact. The roofs of most houses have either lead or zinc for gutter purposes. Attached, or nearly so, to this, is the iron or zinc pipe which conveys the rain water to the drain. If, therefore, the house be "struck," it should follow that all danger would be obviated by the conducting influences thus in operation. Practically, the majority of our high erections of every kind are free every year from injury. We hope to make the reason of these apparent paradoxes evident in this article.

In experimenting with the most powerful friction electrical machine which has yet been constructed, it is found that in damp weather there is no difficulty in discharging a large Leyden battery completely. The same battery in dry weather could not be so completely discharged. In actual experiments the earth wires were connected with a 3 in. iron gas main, which, with the connected gas pipes, had a surface of several hundred square feet. But this arrangement of piping was also a direct connection with the street main in the largest thoroughfare in London. This fact of continued experience seems anomalous, but it has been easily extended in its application by other observers.

Armstrong, of Newcastle-on-Tyne, was the first to discover the production of electricity by steam, his first experiments having been carried on with a stationery boiler fixed in brick-work on an earth foundation. Subsequently it was discovered that a locomotive engine standing on the rails gave similar results. Now it is scarcely possible to find any circumstances in which ready conduction could have been more favorable. But still more recently the late Dr. D. Lardner endeavored to explain the cause of an explosion in a locomotive in the United States, while standing on a railway in an exposed condition. He conceived that the "electric fluid" suddenly decomposed the water and produced a mixture of hydrogen and oxygen which, coming into contact with the furnace fire, exploded. Of course the theory thus enunciated was simply ridiculous. But still this shows, with the cases we have already named, that some extremely anomalous circumstances exist which apparently contradict our received theories of electricity. From accounts we have seen, some singular phenomena in reference to lightning conductors have been observed in Italy. At the base of a conductor the earth was torn up and scattered in all directions.

Now a careful consideration of the laws of induction, conduction, resistance, &c., will lead to a satisfactory conclusion in respect to this occasional inefficiency of "lightning conductors," and also of the occurrence of fatal and destructive results, either in the partial presence or entire absence of such so-called conductors. We have well ascertained standards of the relative resistance of the conductors and insulators, and it becomes simply an application of known laws and facts to get rid of our difficulty. Nature helps us in the same direction.

The term "electric fluid" has lent much help to lead us into mistakes; but if we adopt it in their correction, we may find a solution of our difficulties. In a lightning conductor we have a metallic wand or rod by means of which rapid induction, and consequently conduction, takes place. The end of this rod is inserted in the earth, whose resistance is certainly not less than fifty million times more than that of the conducting rod. Consequently, when the charge arrives at the earth terminal of the rod, it receives a check. Let us fancy the case of a volume of water quietly passing through a 6 ft. main, at a pressure of say 100 lb. per square inch. It passes off quietly. But supposing that *suddenly* a resistance of fifty million times its force be presented to it, the consequence would be fearfully destructive. Precisely the same result occurs where an inadequate pressure is made in the case of lightning conductors. The system of induction or conduction is interrupted, and the destruction of buildings is a natural consequence.

The question arises as to what remedy presents itself, and this is not difficult to answer. In nature we find that, despite the altitude of large trees, it is rarely that they are struck, provided that they are in a living condition. The reason of this is that every leaf and twig makes so many lines and points which favor the restoration of the electric equilibrium. It was stated at the Academy of Sciences, Paris, some years ago, that an ordinary haystack was a comparatively safe object in a thunderstorm. It is very rarely that they are injured. This remarkable fact is easily explained. If a piece of grass leaf be affixed to the nob of a Leyden jar it will be impossible to charge the latter. Arago, we believe, was the first to point this out. In nature, therefore, every leaf and twig is a pointed body, tending to combine, gently, the opposite electricities. But another provision exists in nature; the roots of all vegetable products, especially of large trees, extend in almost numberless ramifications in the ground. They thus have every chance of discharging electricity. Even in ordinary telegraphic practice a large earth plate is desirable. But the total tension of the most powerful voltaic batteries thus employed is infinitesimal when compared with the tension of the charge involved in producing a flash of lightning.

If we compare the above facts with those presented in the conditions of buildings in towns, we shall find that an entirely opposite state of things occurs. The top, roof, and exterior of our erections have all rounded surfaces, presenting no points of radiation such as those possessed by trees. The materials employed for building are all bad conductors, and when dry, as during hot weather, are really good insulators. The boiler seated in dry brickwork, already mentioned as having given to Armstrong the first hint as to making a hydro-electric machine, shows what an insulating effect dry brick possesses. The little metal work on the roof and in the water pipes also present no "attractive" surfaces. Consequently, under such circumstances, the restoration of the electric equilibrium is impossible, in many cases, without an explosion, which too frequently ends in loss of life and ignition of the house.

A great lesson, therefore, to be learned in erecting lightning conductors, is to extend in all possible directions their terminals beneath the ground. One of the best plans to effect this would be to connect at the bottom end of the conductor a large branch of wires bent outward in all directions through moist earth. The importance of moisture cannot be overrated. This is instanced in telegraphic practice in Northern Russia. It is impossible to "get to earth" in rock that is hard, dry and frozen. The lightning conductor may have been properly fixed and of the best materials; but if, to use a popular phrase, it cannot "carry away the lightning," its use will be very limited, so far as safety is concerned, and under certain exceptional occurrences it would be valueless, and fostering an idea of safety when there is really none.

The only proper material for a lightning conductor is copper, and, in our opinion, a flat band is much better than a cylindrical rod. The band is easily adapted to various ornamental and other projections of a building. Beside ramifying the bottom, it is also advisable that the top should be furnished with several points. Perhaps the following experiment will teach more than a long series of remarks on this subject. Two persons were placed in front of a hydro electric machine of great power. It was carefully insulated, and the atmosphere was free from moisture. One of the persons was in a profuse state of perspiration, while the other was not so. The first presented a common nail to the machine while in action. The ordinary length of the spark was about 18 inches, but it passed off harmlessly as a brush to the earth by the body without giving the slightest shock. The other person held in the hand a brass rod, ended by a small ball. On presenting this to the machine he was instantly thrown down, receiving a violent shock. This experiment has been repeated many times—always with the same results. It is highly instructive, and well deserves the study of all who have to do with the erection of lightning conductors.

A point of vital importance is almost constantly neglected in erecting a lightning conductor; it is that of connecting with it all the metallic exterior coverings, &c., of a building. In the ordinary factory chimney, of course, this precaution is generally unnecessary. But in the case of a church, this precaution is of the utmost importance. As a rule, the conductor is affixed to the steeple, carried to the earth, and there is an end of the matter. Iron rods are employed, and in the course of time, by oxidation and other causes, the rod breaks, and the value of the conductor is greatly lessened, if not destroyed. But on the roof are masses of metal, and between the stones clamps of iron. Now, for entire safety, every one of these should be put into metallic connection with the conductor. The reason of this is plain if the old idea of conductor be substituted by that of induction. Not only the conductor, but every metallic body is susceptible of induction, and isolated masses of metal may, therefore, become sources of danger. Consequent on this, instances have occurred in which injury to buildings has been caused, although they were supposed to be protected, by a conductor. The following facts illustrate this: In experimenting with the hydro-electric machine just named, it was found that although carefully insulated from a wooden floor on which it stood, shocks would be obtained whenever a person stood on any of the several iron rings which were let into the wood. The rings had no metallic connection with each other, nor with the machine. But by induction they became charged. So constant are these shocks that an experimenter who does not wear shoes protected by an insulating material, will be thrown to the ground and subjected to very severe shocks. Now precisely the same effect is produced in buildings in which metallic masses occur isolated from the conductor. An easy remedy presents itself; it is that of connecting all these masses by means of wires with the main conductor. The whole metallic portion of the building becomes one, and not only so, but every mass becomes an additional aid to the efficiency of the main conductor, and consequently the safety of the entire building is insured.

A similar precaution might be adopted in our houses at little expense, which at least would be of some value. Generally the chimney of the house is struck, possibly because the pot may be of metal. But there is another reason. The fine soot that lines the chimney is a conductor of electricity. Popularly (but not scientifically) the following results take place: the lightning gets to the iron stove, leaps across the room to any metallic or gilded article (such as a looking-glass), and for want of any other means of escape, in the absence, say, of gas fittings, it flies to the bell wires. These are frequently fused, not because they are too thin to carry the charge, but because they have no continuous conductor to the earth, their ends being always a bell hung high from the ground. No wonder, then, at least, at the destructive effects of the lightning. A simple and efficacious means for protecting dwellings is to connect all the fire places, iron bedsteads and bell wires by means of one wire to the iron rain water pipe, polishing the surface of this at the junction, and contact being also insured by soldering. A house thus protected may be struck, but it would scarcely be possible that it should be seriously injured. Half a pound of No. 16 gauge copper wire, costing about one shilling, would thus protect each of the great majority of houses in an ordinary town, and induce an amount of confidence which would banish that sense of fear which many persons feel during thunder storms.

We have witnessed some curious results in the case of accidents from lightning. Some of these are at present inexplicable under our present limited knowledge of electricity. In cases of persons being struck, the coin or watch in the pockets has been partly fused, although of silver. A curious case came under our observation some years ago at Glasgow. Three persons had taken refuge under a tree; they were struck, although the tree was uninjured. The heels of all their boots, being heavily nailed, were torn off, but the persons sustained no serious injury. These, and many other facts we might adduce, show the necessity of connecting all metallic bodies with the main conductors to insure complete safety.—*Engineering.*

Iron Work on the East River Bridge.

The New York tower of the East River bridge has nearly reached the level of the roadway, and the view now obtained from its summit is the same as will be had from the bridge when completed. The whole of New York, and the greater part of Brooklyn and Williamsburgh, constitute but a portion of the prospect which is seen from this elevated position. On a clear day one can easily see some of the villages on the Hudson, portions of New Jersey, Staten Island, and New York harbor. On the Brooklyn side, the three piers which extend above the roadway, and are to support the cables, have been brought up to the springing line of the arches.

The laying of masonry on the New York tower at present proceeds but slowly, on account of the iron work necessary at this stage of the construction. Nearly a week is now consumed in laying a single course of masonry. At the seventieth course the use of iron cramps was begun. The cramp consists of a bar of round wrought iron, about 1¼ inches thick and 3 feet long, three inches at each end being turned down at a right angle to its length. Its office is to bind together two adjacent stones. A hole is cut in the top of each stone, into which the ends of the cramp are inserted, and a groove is cut on the upper surface of the stones upon which the cramp lies. The holes into which the ends of the cramp are inserted are filled with cement, and a strong bond is thus secured. Thirty-two of these cramps were placed in the seventieth course, and the number has been gradually increased as the tower was carried upward; the seventy-ninth course contains sixty-four cramps. They are laid parallel to the face of the tower, that is, at right angles to the direction of the bridge. Their object is to counteract the tendency of the tower to spread where the weight of the bridge comes to bear upon it.

To provide still further against the tendency of the tower to spread, the four courses below the roadway, viz: the 76th, 77th, 78th, and 79th are strengthened by stong eye-bars, consisting of flat iron five inches in width by one in thickness. There are two of these in each course, one in the front and the other in the rear, each extending nearly the whole length of the tower. The bar is secured to the masonry at each end by pins three inches thick and two feet long, passing through an eye in the bar, and extending nearly a foot into the masonry above and below. Each bar really consists of two bars joined in the center and firmly bound together by iron wedges. A groove is cut in the upper surface of the course of masonry on which the bar lies, for its reception, so as not to disturb the level of the course above.

In the 79th, 80th, and 81st courses are laid a series of compound steel bars ten inches wide by two in thickness, designed to prevent the swaying of the bridge from side to side from the action of the wind or any other cause. There are two of these bars in each course, one at each end. Each bar is composite, consisting of three sections connected together at their ends by splice-plates and bolts. The outer one of the three, or that which projects from the face of the tower, is straight, and has such an angle with the face that, if continued, it would strike the bridge about half way across. The middle section is curved, and the third section, which is spliced to this one, projects sufficiently beyond the rear of the tower to allow a pin to pass through an eye cut in its extremity. It makes the same angle with the rear of the tower as the front section does with the face. Each of these compound bars weigh 2½ tons. As before stated, there are three tiers of such bars at each end of the tower; their ends project beyond the masonry, and a pin six inches thick driven through the eyes in each set of projecting ends secures them firmly to the tower, and combines the three tiers at each end of the tower in one powerful link. Two heavy cables are fastened to these bars, one to each link. Each cable proceeds from its link to the center of the other edge of the bridge, and then passes over to a corresponding link on the opposite tower. A series of smaller irons, intended to supplement these bars, are also fixed in the tower, and from these are to extend cables to a point half way between the middle of the bridge and the shore.

A series of eye bars extend through the tower a few courses below the roadway, and parallel to the axis of the bridge; they are directly under the future position of the bridge trusses, and are to be connected with tension cables, which extend diagonally upward to the lower surface of the bridge. The function of the latter is to give a greater degree of rigidity to the structure. The connecting walls of the tower are cut at the 80th course, in order to receive the trusses which rest upon and fit into that course. The tower, it will be remembered, consists virtually of three towers joined by connecting walls. At the 81st course the latter are discontinued, and the three piers carried up independently, as can now be seen in the Brooklyn tower. The center pier of the three is built entirely of dimension stone, even the backing being constructed in this manner. A very great degree of strength is required of this pier, inasmuch as it is to support two of the main cables, and is narrower than the two exterior piers, each of which support but one cable. The latter, however, are also to be constructed largely of dimension stone. There are now about forty men employed on the New York tower; of these ten are engaged in cutting the holes and grooves in the stone, and five in laying the masonry.

As soon as the 80th course is completed the method of carrying on the work will be completely changed. The old boom derricks will be taken down, and their places supplied by a pair of balance derricks for the exterior piers and a traveling crane for the middle pier. The reason for not using a derrick in the latter case is that it would be necessary to have a well-hole in the center of the pier, in which to place the mast, and the pier would be thereby weakened. As great strength is required in this place such an evil is avoided by the use of a traveling crane instead of a derrick. Both the crane and one of the derricks are now completed, the other derrick being nearly ready. The boom of each derrick is thirty feet in length, and the span of the traveling crane is about eighteen feet. The new engine for hoisting stone, etc., to the top of the tower is also ready. It has two hoisting drums, both on the same shaft, and while one drum is engaged in hoisting to one end of the boom the other is unwinding its rope and allowing the hook to descend at the other end of the boom. As soon as the 80th course is laid all the machinery formerly used on the tower and the docks will be rapidly dismantled, and the new appliances substituted. Every portion of the machinery exposed to heavy strains is tested once every day, and as the work approaches completion, all the calculations connected with it are made with greater exactness.

The four anchor plates for the Brooklyn anchorage are already in position. (For a full description of the anchorage and anchor plates, see *The Iron Age* of May 22, 1873.) They are laid at a depth of 24 feet below the surface of the ground, and six courses of masonry have been laid upon them. About twenty buildings have been torn down to make room for the anchor walls. In all the calculations respecting the strength of the various portions of the bridge one-sixth of the theoretical strength has been taken as the maximum, in order to leave a wide margin of safety.

The Iron Age.

New York, Thursday, September 25, 1873.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
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The Panic—Its Causes and Consequences.

The disastrous panic which began with the suspension of the great banking house of Jay Cooke & Co. on Thursday last, may be considered the natural result of causes which, though operating more suddenly and decisively than was expected, must sooner or later have precipitated a financial crisis. As we have given elsewhere a condensed history of the events of the week, it is unnecessary to review them here, but while it is important to estimate as carefully and accurately as may be the probable consequences of the panic, it is both interesting and profitable to examine the causes, immediate and remote, which have led to it.

Primarily, the cause of the panic is found in the unwise policy of the government in unduly stimulating railroad operations by large grants of public lands. Encouraged by the success of the projectors of the Pacific Railroad in carrying through a great enterprise on the strength of liberal aid from the national government, speculators in Congressional favors and franchises have sought to follow their example. Congress, with lavish generosity, voted them vast tracts from the public domain, and under the stimulus thus applied the building of great lines of railroad through thinly settled and partially developed sections of the West and Northwest has been undertaken on a scale so extensive that the country has been unable to meet the expenses of their construction. The bonds of these roads have been placed upon the market under the most favorable auspices; great and wealthy bankers have linked their fortunes with those of the enterprises they represented in the capacity of financial agents; statesmen high in office and in the public confidence have not thought it improper or unbecoming to endorse the schemes unreservedly and give reasons for so doing; the newspaper press of the country has lent its aid in inflating the bubble, and it has burst, spreading fear and apprehension throughout the whole country, and shaking public confidence as it has not been shaken since the great panic of 1857. Secondarily, the government is responsible for the panic, in that it has hampered the banks with legal restrictions, requiring them to hold a reserve of from 15 to 25 per cent. of their demand liabilities, thus enabling unprincipled speculators to compel the banks to curtail their loans at the time when the legitimate commercial operations and movements of the country demand that they shall be expended to the utmost limit of prudence. The lesson to be drawn, therefore, from our analysis of the causes of the panic are, that the government should henceforth refrain from unduly stimulating railroad construction by subsidies, grants or concessions to specially-favored corporations, leaving the expansion of our railroad system to regulate itself in accordance with the requirements of commerce for increased facilities of transportation; and that it shall leave the banks free to conduct their business on business principles, and not in accordance with arbitrary statutes enacted by a law-making assembly which has repeatedly shown itself incapable of understanding either the evils or necessities of our financial system.

Of the consequence of the panic it is, as yet, impossible to speak specifically, for we do not know how far or in what direction will spread the mischief resulting from the general loss of confidence in financial and commercial circles. But it is not too soon to form definite opinions with regard to its effect upon the iron trade, since the present condition of affairs has been approached so gradually that we discerned and measured its shadow long before the event itself transpired. For many months past there has been a growing distrust of railway mortgages among the small capitalists who have heretofore liberally invested in them, tempted by the glowing promise of large interest. It has, consequently, become more and more difficult to negotiate securities of this description, construction on most of the great railroads has been suspended for want of money, and railroad progress effectually checked. Under these circumstances the banking houses which had undertaken to tide their respective railroad enterprises over this dull season by liberal advances of money and credit, found their burdens greater than they could carry. Even they might have stood the test had they not followed the more than dangerous practice of loaning other people's capital, as well as their own, upon securities which it is impossible to realize upon at the time when they are called upon to account for the funds entrusted to their keeping. With their suspension the public have, naturally, though perhaps without good reason, lost what little confidence they had in railway investments, and it will be a long time before it can be re-established. The mania for railway speculation is followed, as was feared, by a powerful and sudden reaction, and the effect of this reaction cannot but be felt, more or less severely, all over the world. In this country the shock is of course greatest, and its effects most lasting. For a long time to come it will be impossible to negotiate in large amounts any but the best interest paying securities, and those who want capital for railroad construction will have to show that the lines they propose to build are needed to supply a present, and not a prospective, need of increased facilities for transportation. There will not be a stoppage of railroad building, for several thousands of miles of necessary railroad are now in progress which will be pushed forward as rapidly as capital can be obtained, and of these many are so far advanced as to render the losses from suspension greater than the risk incurred in completing them. It was estimated, a few weeks ago, that we would this year build and equip about 3500 miles of railroad, or about half the mileage completed in 1872. It is impossible, at this time, to say how far this total will be reduced by the events of the past week, but as little work will be performed on any new railroads before next Spring, we may be said to have already completed within a few miles our total mileage for 1873. This sudden check to railroad building cannot but react powerfully upon the iron trade. Last year the consumption of new iron in railroad construction and equipment amounted, in round numbers, to at least one-half the domestic production. This year it is probable that the production of iron will fully equal that of last year, if it does not somewhat exceed it, and the consumptive requirements of the railroads will be reduced more than one-half, as the causes which operate to check progress will also compel railroads in operation to reduce to a minimum their consumption of iron in repairs and increase of equipment. While, therefore, we do not feel justified in venturing any estimates of railway mileage or consumption until it is known how far and in what directions the panic will extend, it is certain that the railroads will this year require an amount of iron far below what would have been a safe and reasonable estimate three months, or even three weeks, ago. According to the best information at hand, the railroads last year consumed in rails alone, taking domestic and foreign together, about one million two hundred and eighty thousand tons. Of this amount about four hundred and eighty thousand tons were of foreign manufacture. This year the market has been relieved by the heavy falling off in the importations of railroad iron. The receipts of foreign rails for the week ended September 13th, and since January 1st, have amounted to 477,505 bars, against 783,794 bars for the corresponding period of 1872. This leaves a difference of 306,289 bars in favor of domestic makers competing for orders. Estimating the capacity of our rail mills, upon the basis of last year's make, at 850,000 tons—a production which would keep them fairly, if not fully, employed—we find that the probable consumption of rails this year, even with diminished importations as shown, will not more than equal one-half the capacity of our rail mills. This is a serious matter, but less serious than would appear at first glance to one unacquainted with the course of the iron trade. The extreme dullness which has prevailed for several months in rails and mill irons has placed the market in such a condition that the panic cannot materially change it for the worse, though it postpones the recovery which was anticipated before the end of the year. It is still uncertain to what extent the rail makers will suffer from the forfeiture of existing contracts on the one hand, and the shrinkage in the value of railway securities on the other. It is well known that many contracts for railroad iron have been accepted on the condition of receiving part payment in railroad bonds, and the question of how far the ironmasters are involved cannot be answered until it is known to what extent they have already marketed these securities. If they have held them, it will probably be a long time before they can convert them into cash, except at prices which would involve heavy losses in the fulfillment of their contracts.

But while we have no desire to underestimate the gravity of the situation, or the nature and extent of the evils which will follow the shock to American railroad credit, we take a hopeful view of the future, and see in the events now transpiring the possession of ultimate and permanent benefit, rather than injury, to our productive and distributive industries. We have not space at this time to examine the probabilities of the future as regards the iron trade; we shall have more to say on this subject in a future issue: but we feel confident that the suspension of railroad building will be not only temporary, but of much shorter duration than is commonly supposed. The shock has been severe, but so far nothing has been overthrown except unsubstantial structures reared upon the foundation of doubtful speculation. The capital heretofore seeking investment in railroads will be transferred for the time to other branches of industry, and the result of the impetus thus given to commerce and manufactures will be to create a demand for additional facilities of transportation, and to necessitate a renewal of railroad activity on a more extensive scale than ever before. By next spring—and but little can be done in the way of railroad construction in winter under any circumstances—we expect to see confidence so far restored as to admit of the completion of the greater part of the roads now in hand, and if our progress in railway extension is less rapid during the next few years, we shall have the satisfaction of knowing that it is a healthier and more substantial progress, and less speculative in its character.

Is Cheap Labor Favorable to Cheap Production?

In another column of this issue, we publish a letter from an American manufacturer in England, which merits perusal. Our correspondent, a gentleman well acquainted with the subject of which he treats, calls attention to the primitive character of the machinery and processes employed in British workshops and factories, and contrasts them with those in use on this side of the ocean in a manner which cannot be said to be complimentary to our neighbors. Relying upon cheap hand labor, the British manufacturer has expended but little of either capital or study in providing himself with improved machinery and tools. There has, indeed, been no necessity for so doing. Labor has been abundant and wages uniformly low, and generation after generation of workmen and artisans have grown up to take the places and use, more or less skillfully, the simple tools and implements which served their ancestors a century ago. In this country, on the other hand, the greatest possible economization of labor has been the first indispensable prerequisite of success in manufacturing operations. We have never at any time had a surplus of skilled labor in any department of industry, and, as compared with Great Britain and the Continent, wages have always been high. As a consequence, we have necessarily had recourse to labor-saving machinery. Inventive talent has been stimulated by a constant and urgent demand for more economical methods, processes and implements, and in nearly all branches of manufacture machinery now performs rapidly and cheaply work formerly performed at greater cost of time and energy by hand labor. One has but to study the records of the Patent Office at Washington to see how powerfully, and in how many directions, the characteristic American talent for the invention and improvement of labor-saving machinery has been stimulated by the fact that, without such machinery, we should be unable to compete with foreign manufacturers enjoying the doubtful advantage of cheap labor; and it is because of the wonderful progress we have made in this direction that we have had the capacity for such rapid and sustained industrial development. That our superiority in this respect over all other nations is recognized abroad, at a time when labor is demanding and receiving a larger share of the profits of production than formerly contented it, is certainly not to be wondered at. A correspondent of *Engineering*, writing from Vienna on the machine tools at the Exposition, says: "Leaving the "American collection, and passing on to the "British section, we cannot but be struck by "the different characters of the exhibits. In "the American department almost every "tool possesses some novel feature, and each "is distinguished by an individuality which "shows it to be the special design of its "maker; while in the British section the "great majority of the tools are reproduc-"tions of old and well-known patterns, pos-"sessing scarcely any interest whatever as "exhibits." The correspondent of another journal, speaking of the American shoe machinery exhibited, says with evident enthusiasm: "The whole day through crowds stand "before the manufacturing machinery at the "Vienna Exhibition, which is arranged in a "separate group, and with wonder in their "faces watch one process after another, "which entirely by machinery takes up the "rough leather and turns it out finished "boots and shoes. Nothing in the whole "Exposition is more wonderful. And these "machines have a significance that touches "one of the great social questions of the "day. As demand increases these wonder-"ful inventions go on multiplying the re-"sults of labor, till one pair of hands can, "with the aid of power, do the work of "twenty. There is to be no more tiresome "pegging away at lapstones, but, instead, "your intelligent shoemaker has in his "shop a little machine that click—click—"click, in a few seconds has pegged his cus-"tomers' shoes, and not only pegged the "shoes, but made the pegs beside. This we "see done every day by the machines of the "American Shoe Machinery Company, of "Boston. They have machines, too, that "sew shoes so well that an expert can hard-"ly tell them from hand made; and their "sewing machines not only sew faster and "better than a cobbler, but wax the thread "beside." Even the London *Times*, reluctant as it is to concede American superiority in any department of manufacture, says, with truth and candor which command admiration: "For some years the American "manufacturers have had to contend with "the disadvantage of dear labor; but this "very circumstance has, in the long run, "proved a benefit to them, seeing that it has "enforced the application of labor-saving "machinery on a much larger scale than "has been attempted in this country. The "superiority of American fine iron castings "has long been acknowledged, and in the "earlier years of hardware manufacture in "the States, the dearness of labor was large-"ly compensated by the substitution of cast "for wrought iron in almost all classes of "produce. This advantage was, however, "obtained at the expense of the quality of "the goods for strength and endurance, and "the necessity of increased mechanical ap-"pliances for the saving of hand labor be-"came apparent some years since to the "leading manufacturers of the States. The "wonderful system of labor-saving machin-"ery now existing is the result. Railway "fastenings, door locks, spring bars, curry-"combs, tin wares, and some descriptions of "edge tools are among the classes of pro-"duce in which American competition is "beginning to be seriously felt in Birming-"ham and the South Staffordshire district. "Last year's produce of iron rails in the "States was nearly 1,000,000 tons, of which "Pennsylvania alone yielded nearly one-"half. Other descriptions of finished iron "are also being produced in large and rap-"idly increasing quantities, and at the pres-"ent rate of progress, the shipment of iron "from England across the Atlantic will "soon become a thing of the past."

We might multiply extracts of this kind from the representative journals of Great Britain and the Continent, but it is scarcely worth our while to do so. It needs no accumulation of proof to establish the fact that high wages have been of great and permanent advantage in compelling our manufacturers to substitute machinery for hand labor wherever such substitution was possible, and our own experience teaches us that with this machinery we are enabled to produce more cheaply and abundantly than would be possible without it, even though labor were as abundant and cheap here as it was in Great Britain ten years ago, and is still to-day in many parts of the Continent of Europe.

We now pass to the consideration of another and, perhaps, equally important reason for believing that cheap labor is not favorable to continued cheap production, though it may give a nation a temporary advantage. With the establishment of facilities for easy and cheap communication between nations has come the temptation and the opportunity to emigrate to those countries in which labor is best compensated. In this we see the greatest and most immediate benefit of high wages, for the liberal remuneration of labor in this country has attracted to our shores millions of skilled artisans and mechanics, who, while adding to our labor supply, represent an irreparable loss to the productive industries of the countries from which they are drawn. With the statistics of immigration our readers are already familiar, but some idea of the extent to which we are acquiring strength at the expense of our neighbors may be gained from the fact that, during the ten years ended with 1872, not less than 2,302,234 persons sailed from British ports, chiefly for the United States, leaving home because of the low wages which British manufacturers have regarded as the basis of their business prosperity, and coming here because of the higher wages and larger opportunities for prosperity and happiness. Also, that, during 1872, passage tickets to the value of nearly $1,500,000 were sent from this country to Great Britain to bring fresh immigrants to our shores. It is easy to talk, as some British journals do, about "ridding the United Kingdom of its surplus population," but it is the surplus that is left at home. Glancing at the statistics of immigration, we find that a majority of those coming to this country from abroad are adults in the prime of life, skilled in some special trade or occupation and, when unskilled, capable of being made useful in almost any department of manual labor. Professor Kirk, in his thoughtful work on "Social Politics in Great Britain and Ireland," speaks as follows of the effect of emigration upon the mother country: "How "do the Emigration Commissioners account "for the vast deficiencies in the population "Ireland? More than two millions and a "half of deficiency was double the emigra-"tion, but it was accounted for by the fact "that the young men and women have gone "off to such a degree that marriages and "births have fallen off sufficiently to ac-"count for all. The proportion of persons "between the ages of twenty and thirty-five, "in the ordinary settled course of society, "is about twenty-five per cent.—that pro-"portion among emigrants is above fifty-"two per cent. * * * It is the best of "our mechanical and manufacturing hands "that are now going, and they are leaving "the proportion of those who burden so-"ciety largely increased." Thus high wages are bringing to our shores not the old and feeble, the idle and the vicious, but vigorous men and women to build up our industries and increase our population. Nor will this westward flowing tide of emigration cease so long as we can maintain a high standard of wages in this country; at least not until the drain upon the labor markets of the old world shall have compelled employers to offer wages as high as those obtainable abroad, as an inducement to the working classes to stay at home.

We have thus seen that out of the seeming disadvantage of dear labor the manufacturers of this country have derived two great and important advantages: they have largely substituted machinery for hand labor, and have attracted from the workshops and factories of competing nations millions of skilled artisans whose places will never be filled, since they bring their families with them. May we not, then, confidently assert that high wages tend to increase and cheapen production, while low wages tend to drive away labor and to discourage all efforts to economize human effort through the use of labor saving machinery?

It is one of the many specious arguments of those who are seeking to break down our tariff system that, because of protection to home industry, the standard of wages is higher here than in Europe; and that if we had free trade we should be enabled to produce more cheaply, and successfully compete with foreign nations in the manufacture of goods for consumption and export. To this we reply: Protection has maintained in this country a high standard of wages, and we hope it will continue to do so for many years to come. We do not want cheap labor. If we had had it we should have depended upon it; without it, we have made arms of iron and fingers of steel perform a thousand tasks more rapidly and cheaply than they could have been performed by hand labor, and millions of intelligent and ambitious men have been emancipated from the drudgery of rude labor to engage in higher and more ennobling occupations. The day is past when men are

willing to toil for a pittance barely sufficient to keep them and their dependents from starvation, and even in those countries where, for centuries, labor has been cheapest in proportion to the demand for it, there is a rapid approximation to our own average standard of wages, with but little prospect of a return, even in the remote future, to the condition of affairs which prevailed in those countries before the laboring classes found the courage to demand a larger and more equable share of the profits of production. Thus cheap labor has proved an uncertain, as well as a cruel, dependence: and we have reason for sincere and profound gratitude to the Almighty ruler of nations that we have not been permitted to build up our manufacturing prosperity upon any such foundation.

The British Iron Market.

Recent mail advices show that the anticipated "turn" in the British iron markets has come at last, but, contrary to the general expectation, the tendency is toward greater firmness in prices. Evidently the oft prophesied decline in coal and wages and, consequently, in iron, has been postponed until further notice. The London *Times'* commercial correspondence columns show how general is the improvement in trade, accompanied, in many localities, by an advance in the prices demanded for the various forms of manufactured iron. At Birmingham "a marked tendency toward higher prices for finished descriptions" is reported. The same journal says:

Both the Scotch and the English markets have rallied famously. The market value of Scotch pig iron has steadily gone up day by day, until the quotations have now reached 10/ per ton more than they were on this day week. The same market is still very strong, with an upward tendency. This is accounted for by the increased demand that has arisen both for home and foreign consumption. The prices of Yorkshire iron have materially improved. No. 3 is at least fully up to the highest rates which have been in vogue for some few weeks past, while forge iron is no less than 5/ per ton higher. Coals show no tendency in West Yorkshire, at all events, to any reduction; nor is any expected, but rather an advance. Some colliery proprietors of the Leeds district declare that the prices of fuel will in three months hence be higher than ever they have been. If so, the value of manufactured iron must go upward, and a rise may soon be expected. Even now list prices are again fully maintained and insisted upon. In Leeds there are at this moment no less than three strikes by puddlers.

Still later information tends to confirm these statements, and to show that the upward tendency is not a mere momentary fluctuation in prices. The *Times* of the 8th instant says that a decided reaction has taken place in the iron trade of South Staffordshire, and prices have advanced, while coal, sharing in the general improvement, is now selling at prices fully up to the standard of last winter. At a meeting held in Leeds, on the 6th instant, the iron masters of West Yorkshire advanced prices 10/ per ton for bars, plates, and all kinds of finished iron, and the advance is the more significant from the fact that it was made upon the strength of an improvement in trade, without waiting for the quarter-day meeting at Birmingham. At Darlington there was a considerable advance early in the month, and on the 8th instant No. 3 pig iron advanced 5 shillings per ton, with a proportionate advance in finished irons. In the Cleveland district there has been a decided improvement in pig, which was quoted as follows: No. 1, 111/6; No. 3, 105/; No. 4, 92/6 @ 95/, net cash. In South Wales the improvement is not so marked, but a better feeling prevails. The following is reported to the London *News* under date of Sept. 6th:

From most quarters advices as to the state of the iron trade are more encouraging, and this district shares to some extent in the revival. Still, as the rail making trade is not so much affected as some of the lighter branches of the trade, we cannot report any material improvement in the staple industry of South Wales. Manufacturers still feel the loss of American business, and, until some other source of demand springs up equal to America, there cannot be so much activity at the Welsh establishments as formerly. The exports to the United States at present are hardly equal to one-third of what were formerly effected, and there is no doubt that this has arisen to a large extent, if not entirely, from the competition of American makers, who are now turning out large quantities of railway and other iron, and American buyers need not go so much from home for their supplies. Makers must, however, expect to find this competition increase. While, however, America has fallen off as a buyer in this market, the Muscovite trade, which three or four years ago was large, has been revived, and Russian contracts have for some time past sustained a very considerable proportion of the activity which has prevailed at the steel and iron works. Prices are hardening for all descriptions, but so far there is no appreciable advance to be recorded.

With an increased activity in iron manufacture, and the increased demand for fuel for heating purposes as the season advances, we should not be surprised to hear of a rapid and sustained advance in coal, that will pinch the ironmasters sorely. As to labor, it may be said that there is no immediate prospect of the establishment of a better understanding between masters and men than has existed during the past year. How far the financial panic in this country will affect the British iron market remains to be seen. We do not think it will make any immediate difference, as the exports of iron to the United States are now so small that a further curtailment would not materially disturb the market. The advances are made on the strength of a home and foreign demand other than American, and it is interesting to speculate upon what would be the prices of English iron if there were any considerable American demand to supply.

By the arrival of 70 more Chinamen at the Beaver Falls (Pa.) Cutlery Works the force has been increased to 215.

Our Foreign Trade in Iron.

The British Board of Trade returns for August, and the seven months ended therewith, make the following interesting showing of the comparative shipments of iron in various forms to the United States for the first eight months of 1872 and 1873:

	1872. Tons.	1873. Tons.		Diff'ce. Tons.
Pig Iron	152,331	78,403	Dec.	73,928
Bar, Angle, bolt and rod iron	49,316	21,574	"	27,742
R. R. Iron	340,321	141,330	"	198,991
Hoops, Sheets, Boiler & Armor Plates	10,868	7,102	"	3,766
Cast Wrought, and all other Mfrs. of Iron	9,068	11,806	Inc.	2,738
Steel, Unwrought	16,198	13,966	Dec.	2,232

These comparisons will be found interesting, as showing at a glance how great, and in what forms of iron, has been the falling off in importations from Great Britain. The only increase noted is a slight one of 2738 tons under the heading of cast, wrought and all other manufactures of iron not specified. The following interesting comparative statistics of our imports and exports of iron in 1872, are published on the authority of the Bureau of Statistics at Washington:

	Imports.	Exports.	Net amount Imported.	Add amo'nt in Bond Dec. 31, 1871	Sub't Am't in Bond Dec. 31, 1872
Pig Iron, lbs.	591,004,780	49,930	590,954,850	617,339,401	572,688,475
Bar Iron, lbs.	179,158,436	401,334	178,731,082	232,343,023	182,119,670
Boiler Iron, lbs.	1,960,158	6.05	1,960,463	1,591,233	1,263,303
Band, Hoop and Scroll, lbs	24,720,754	46,961	24,673,793	25,044,790	23,732,965
Railroad Bars or Rails, lbs.	762,124,379	15,913,566	746,315,873	822,209,295	713,495,678
Sheet Iron, lbs.	30,294,160	44,361	30,253,319	33,973,648	26,894,115

It is not often our British exchanges speak of the American tariff system as likely to withstand the efforts which have been made, and are now making, to overthrow it; but once in a while they take a common-sense view of the subject. The *British Trade Journal*, for example, concludes a lament over the loss of trade with this country as follows: "There certainly seems but poor "hope of regaining the ground we have lost. "America, there is no reason to believe, will "abandon her protective tariff, and look- "ing at her large and rapidly increasing "production of iron, we should say that at "the present rate of progress, the shipment "of that commodity from England across "the Atlantic is in a fair way to become a "thing of the past." It is also gratifying to our national pride to note that not only the newspapers, but the trade, are taking this view of the subject. In the lately published report of the Birmingham Chamber of Commerce we find the following: "The "vast market of the United States of Amer- "ica is gradually becoming independent of "this country for its supply of iron—is even "supplying our own colonies with that "metal; indeed, it is reported that the anom- "aly has recently been witnessed of an "importation of manufactured iron from "the United States into this country. Un- "der existing conditions we are compelled "to admit our inability to compete with "North America in the production of an ar- "ticle which, until recently, was a special "monopoly of this country."

Scientific and Technical Notes.

Rev. Arthur King has lately delivered a lecture of much interest on "The Energy of Heat," from which we extract the following on the subject of

GLASS GAUGE TUBES:

Here is a piece of unannealed glass. Those present who have to deal with steam engines know that it very often happens, from some apparently unaccountable cause, that what are called the water guages of the boilers are broken. These breakages are in consequence of the glass tubes being unannealed; and if you are aware of the process by which tubes are made, you will see at once they cannot, without some special arrangements, be annealed. They are made by taking a solid ball of glass out of the pot; this is then blown into a globe; then a second man puts a pipe with a molten nodule of glass upon it on that part of the globe which is opposite to the pipe by which it was blown. The men run asunder, and so the globe is lengthened out into a tube and laid along the floor. This long pipe is then cut into gauge tube lengths, and generally so sold. If one of these tubes be cleaned with an iron wire, having a piece of cotton wool wrapped round it, the wire being pushed up and down, as is usually done, and the clean tube be restored to the boiler, it may, in two or three days or weeks, fall to pieces without any one being to blame, except those who put the wire through the tube. Here is a piece of glass very thick and strong, and in all respects very good glass, but unannealed. It is really a simple piece taken out of the melting pot as a sample, to guide the manufacturer respecting the quality and color of the articles that may be made from it. Now, in all probability, if this piece of quartz, less than the size of an ordinary pea, be allowed to drop gently into the sample flask, this strong flask (the glass is nearly ½ in. in thickness) may fall into pieces. There! You see the bottom has immediately dropped out, notwithstanding the thickness, and if it were left here all night it might crumble into half a dozen pieces before the morning. On one occasion I cleaned out a glass tube, about 3 ft. long, connected with an air pump, and in a thoughtless moment took a wire, attached some cotton wool to it, and drew it through the tube. In about half an hour there was a click—in a few minutes another click. On looking at the tube it was seen to be cracked. The slight but instructive noises continued, click after click, crack after crack, and in the morning the tube was separated into many hundred pieces, though no one touched it. Workmen and servants are often blamed for the breakage of glass, which breakage arises from such a cause as this.

Recent English explorers have discovered a number of

ANCIENT EGYPTIAN MINES,

and search is to be instituted for other ancient mines of silver, gold and iron. As the processes followed in ancient times for the reduction of ores were very defective, it is expected that in the *debris* accumulated in the neighborhood of the mines an amount of the useful and precious metals will be found sufficient to make the working it over again profitable. At a recent meeting of the British Society of Antiquaries, mention was made of the discovery, in the neighborhood of Mount Sinai, of the turquoise mines of the ancient Egyptians. The discoverer, an Englishman, observed in water courses of that region, which in summer are dry, peculiar blue stones, which he soon ascertained to be turquoises. This circumstance led to further research. We are now informed that, "aided by the friendly tribes he has taken into his pay, he has discovered the old turquoise mines of the ancient Egyptians, the rocks that they worked for the stones, the very tools they used, and their polishing and grinding places." The fortunate discoverer has already sent to England some of the finest turquoises ever seen. While searching for the turquoise mines, the same explorer discovered the ancient lines of fortification surrounding the works, and came upon the remains of vast iron works, which must have employed many thousands of hands. Slag taken from the refuse heaps around these works contains as much as fifty-three per cent. of iron. The whole surrounding district is well worthy of being thoroughly explored by the antiquary, as it contains many hieroglyphic inscriptions, which would doubtless throw much light upon the early history of metallurgy.

An English exchange states that the tempering of the famous

SOLINGEN SWORDS

is accomplished in the following manner: The swords are placed in a coke fire, with tuyeres below, and are heated to a uniform cherry red. Before cooling the edges are drawn through wet coal dust, whereupon the whole sword, the strong end first, is dipped into water and quickly withdrawn. When five swords have thus been treated, another man anneals them until they appear blue, testing them also in a clamp for their elasticity. Finally they are annealed gray. The interior thus remains soft, while the exterior becomes hard.

Mr. P. Brotherhood, of Notting Hill, England, has lately patented an

IMPROVED APPLICATION OF STEAM POWER,

by means of which he applies the steam directly to centrifugal and other rapidly revolving machines, without multiplying gear. Three steam cylinders are arranged with their axis intersecting at angles 120°, so that their pistons act on one crank within a cavity containing steam which presses constantly on one side of each piston. The crank drives a rotary slide, by which steam is successfully admitted to, and allowed to escape from, each cylinder, whereby continuous rotary motion at high speed is imparted to the crank shaft. The crank shaft is coupled or attached to the revolving basket of a centrifugal machine, the driving apparatus being placed either under or above the centrifugal machine, and arrangements are described for allowing for shake or eccentricity and relieving the weight of the rotating parts. Similar apparatus is applied to driving other rapidly rotating machines, such as fans, circular saws, threshing machines, rotary pumps and propellers, and the like, by extending the driving shaft, so that its extension constitutes the shaft of the machine to be driven, or by connecting the two shafts by any known coupling.

Messrs. John & Edwin Wright, of Birmingham, have just completed another

ENORMOUS WIRE ROPE,

to be used on the London & North Western R. R., for working the goods traffic through the Waterloo Tunnel, at Liverpool. The rope is 6000 yards in length, and weighs upward of 33 tons, the breaking strain being equal to nearly 50 tons. We understand that these ropes are by far the longest and heaviest ever manufactured in Great Britain.

The Cork *Examiner* gives the following account of two pieces of

IRISH WROUGHT IRON WORK,

which shows a very creditable skill in that department of industry: They consist, says the *Examiner*, of a sanctuary railing and grill for the chapel and choir of the Mercy Convent, Templemore. The design is floriated mediæval, of light and graceful, though sufficiently elaborate, treatment, divided into greater and subdivided into smaller compartments, the center curves united at the points of contact by neatly wrought roses, while graceful palm-like branches embrace the minor features of the pattern, and inclining their extremities toward each other give a pretty effect, in keeping with the Gothic style of the chapel. The grill will fill three handsome arches, with which it appears likely to harmonize very prettily, the gate occupying the center arch being crowned with a beautiful floriated cross. There is the usual aperture at which the nuns receive Holy Communion, and at the procession time the gate opens in the center to allow the community to pass through the sanctuary. The extreme width of the grill is 11 feet, and its main hight 8½ feet, exclusive of the cross over the gate. The alter railing is 20 feet long, and about 3 feet high, with a double gate in the center, and surmounted by a handsome polished wood molding. The cross, leaves and flowers of all the iron work will be richly gilt, and the *ensemble* will be exceedingly elegant and appropriate. The whole work has been executed in Messrs. Perry's establishment, chiefly by a clever artizan Mr. F. Burke, and, considering that every part of it has been wrought by hand, it is impossible not to admire the exceeding neatness and mathematical accuracy with which it has been turned out. Competent judges have pronounced it the best specimen of home manufacture in this department they have seen, and believe it will compare advantageously with productions of a like kind emanating from English or Continental workshops. The total cost is about £110, and it seems well worth the money.

The *National Zeitung* reports that the trials lately made at Williamsburen with

THE NEW HERTZ TORPEDO,

in presence of General von Stosch, the German Minister of Marine, have given most surprising results, the torpedoes disposing of the objects attacked in a very summary manner. The construction, of course, remains a secret at present; but there is no doubt that the German navy is now in possession of a most powerful and destructive weapon, which will not only effectually protect the coasts of the empire, but will also enable the government to employ all its resources in building ships for aggressive purposes. The inventor of the new torpedo is said to be Dr. Albert Hertz, a native of Konigsberg, who volunteered for the German navy at the outbreak of the French war, and now holds a commission therein.

A writer in the *European Mail*, discussing the subject of

WIND AND WATER AS MOTORS,

says: In the case of a ship, there are two things to be considered. The pressure of the wind is of two kinds: 1. That upon the sails, which could be applied to machinery, and of which a certain proportion could be converted into energy, and applied to moving the vessel. 2. That upon the hull, rigging, &c., the total amount of which (added to the increased pressure by any supposed advance) must be deducted from that available for conversion. Mr. Schucht gives his machine what Archimedes is said to have required in order to remove the world, a *point d'appui* outside of it. He had much better set about making a model which would realize some actual conditions, and tell us whether it has worked its way across a pond against the wind. When he can make such a statement, the matter will be worth inquiry as a mere interesting application of principles. Till then discussion is simply waste of time, because although the conditions are different from the usual perpetual-motion nonsense (as it is not perfectly clear how large a proportion of the wind pressure could be applied to the machinery), yet it is pretty certain that no practical benefit whatever could be obtained, and that such machinery would simply be an enormous outlay, made for the purpose of doing less advantageously what can be done already in a much simpler manner by means of sails. Of course, when a ship is working to windward, the pressure of the wind is really so applied as to overcome itself, and give a surplus energy; and this is effected by means of the friction of the water and the hull. Mr. Schucht might attach his windmill to the truck, substituting for the screw an axle and gearing to the wheels; he would then see whether the apparatus had power to drive itself up in face of the wind upon a plank or rails. Even this, however, would give conditions much more favorable than those of a ship, because with the wheels locked, as would be the case, at least (the sails acting as a break), the wind would not be able to drive the truck backward except in a strong breeze, while a ship would have no such bite upon its supporting water, but would drift freely. Rig a windmill, the axle of which should be supported by a spring balance, which would measure the pressure of the wind when the sails were fixed, and also when free to revolve. Affix gearing which would raise a weight, and measure the wind pressure with varying weights and velocities. Such experiments, frequently repeated in steady winds, would soon show how much of the wind pressure could be converted into work available. With a vertically mounted windmill, the axis would have to be mounted on a bridle, or fitted with two balances to support it against the pressure.

The Newcastle *Chronicle* says of Mickle's

NOVEL SYSTEM OF ECONOMIZING FUEL IN PUDDLING AND BLAST FURNACES.

A most ingenious and, if it is not impracticable, what must prove a most valuable process, has been given to the world by Mr. W. Mickle, of Tynemouth. That gentleman proposes to draw coke from a retort (in which coal has been treated by dry distillation) at a red or white heat, into iron tubs, without having it cooled by water, and to convey it to the smelting furnace, to be used as fuel. With the coke he proposes to combine the use of coal gas and the naphtha or other combustible oil or spirit obtained from the coal used for smelting, the gas being pumped from an ordinary gasholder erected for the purpose by engine power, and conveyed into the furnace through pipes and tuyeres in the usual manner. By this process, which he also proposes to apply to pudding furnaces, Mr. Mickle expects to dispense with calcining and heating stoves, to diminish the available air-blast power required about one-fourth, and to make eight to ten cwt. of the gas produced and heated coke suffice to melt one ton of metal, inclusive of what is required for the deoxidation of the ore and the carburization of metal. Presuming this estimate of its value to be correct, Mr. Mickle's system would lead to an annual saving of 20,000,000 tons of the coal now required in our iron manufacture by reducing the consumption of fuel from 3½ tons to about 10 cwt. per ton of iron made. Should it come within sight of the attainment of this gigantic result, Mr. Mickle's invention will be worthy to rank among the most important of the age.

What an American Thinks of British Machinery.

An intelligent American gentleman, traveling in England, sends us the following regarding the machinery in British work-shops:

The machinery used in England, when compared with our own, is of much older style and ruder construction. The armor plate rolling mills of John Brown & Co., and of others of Sheffield, are large and well-adapted to their work, but their engines bear no comparison to those of many of our best mills—such, for example, as those built for the steel works at St. Albans, Vermont, by Mr. Geo. Corliss, of Providence, R. I.

These Sheffield works roll armor plate about a foot in thickness, the largest rolls we saw being capable of manufacturing a plate about 16 inches thick and 11 feet wide. These large plates of iron are made of thinner ones rolled together, being often 25 feet or more in length. After being squared off on a planer, they are placed on a former, under powerful hydraulic presses, by which means they are made of the shape desired for the vessel, after which they are returned to the planer and fitted perfectly to each other. The steam hammers we saw are, some of them, very large, but we saw nothing about them which we considered superior to those of our best makers.

In power hammers, the old-fashioned tilt hammer, raised by a cam, were the only ones we saw. Of these, a few heavy ones were at work at Jessop's steel manufactory, made of sold cast iron, hung on bearings at one end, and raised by a cam at the other, which was fastened into a large wheel. It is claimed that this company manufacture the largest circular saw plates in the world, their largest rolls for this purpose being able to roll a plate 87 inches in diameter. About 150 tons of steel per week are produced here, made by the old process, and principally used for files, saws and edge tools.

We visited Rogers' Cutlery Works, a large establishment, employing 1000 men. They pride themselves on the age of their establishment, and on the fact that they do not use improved machinery. In fact, they discountenance the use of machinery, except for a few simple operations, such as sawing, grinding, &c.

It is certainly amusing to see two men at a fire in a room not larger than a good-sized horse stall, with one anvil, making a knife blade in the same manner, and with the same implements, as their fathers did. Their dies for forming the shank of the knife are laid upon the anvil, and while one holds the knife and strikes the blow, the other holds the upper die, the operation requiring minutes, while one man, with a common drop press, would perform the same in a few seconds, and do it equally well. After seeing work done in this manner, it ceases to be a wonder that America, with her improved machinery, and even her high price for labor, can hope to successfully compete with Sheffield manufacturers on their own soil.

However, we found some exceptions among these old fashioned manufacturers.

Visiting the works of Nixon & Winterbottom, we found only Mr. Nixon, a man whose enterprise would do credit to New England. He assured us that machinery might be used to advantage in Sheffield with English mechanics. In their manufactory they employ cutting presses, gang drills, shapers for knife handles, &c. In fact, they seem to be awake to the importance of mechanical improvements, and believe that they manufacture as good cutlery as those using only hand-power.

Another manufacturer, who was still in the ruts of hand labor, said to me, "We must use more machinery or give up business, for with the present price of labor and material we cannot compete with American manufacturers."

Having visited one of the largest silver plate manufactories at Sheffield, that of Martin, Hall & Co., and also that of Elkington & Co., of Birmingham, both using what they claim to be the best machinery, we saw no factory that compared with the Britannia works, at Meriden, Conn., of Reade & Barton, of Taunton, Mass., and of several others of our best manufacturers, either in buildings or in the machinery used, but both producing goods of fine quality. Of drop presses we have seen but a few, most of which are lifted by the old friction pulley, with strap or rope.

At Sheffield, the above mentioned company, however, use steam for raising a heavy hammer, a very good one, by the way, but expensive and requiring careful watching to catch the rebound.

A still larger drop hammer is employed by Elkington & Co., which does not catch the rebound, and which cost £2000, or about $10,000, but which is inferior to several of our American machines, which will work better and faster, and which would not cost over one-fifth the amount. At Gillott's pen manufactory, Birmingham, they have a large number of small screw presses for punching, cutting, &c., which are all worked by foot or hand power, none performing more than one operation at a time.

We saw one machine, which was driven by a belt and performed several operations at once, and with ten times the speed of their ordinary machines; but were told that it did not make as good pens. But when asked the reason why, they could give no satisfactory answer, their prejudice against machinery evidently being their only reason.

The question why the English are so far behind in using improved machinery, we believe, may be answered, 1st, by the fact of her cheap labor, which has always been in opposition to the use of mechanical improvements; and, 2d, because the English government, by her exorbitant charges for granting patents, has prevented many valuable improvements from being made by practical mechanics of moderate means, and by not providing competent examiners to investigate the merits of an invention, has left the inventor to his own judgment as to the validity of his claim.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Sept. 24, 1873.

The past week has been one of such wild excitement in the various financial markets that it is difficult to report their condition in a brief review. As we have given elsewhere a condensed history of the events of each day since Thursday last, it is unnecessary to repeat the story of the week in this column, and we will restrict our remarks so far as possible to the condition of the several markets, and the effects of the panic upon them.

As was inevitable under the circumstances, the money market has been completely demoralized, and as the banks have been compelled to call in their loans, the usurers of "poverty corner" have had everything their own way. There has been, consequently, no quotable rate for money, but borrowers have generally accepted accommodations upon any terms lenders saw fit to demand. We know of instances in which money to the amount of fifty to sixty per cent. of the lowest quoted value of the collaterals deposited, has been loaned at rates varying, according to the necessities of the borrowers, from one to one and a half and two per cent. per day, on call.

In the stock market the wildest excitement prevailed on Thursday, Friday and Saturday morning, and there is no telling what would have been the result had business not been peremptorily suspended. In the midst of the excitement on Saturday, when stocks were falling rapidly, a committee of bank officers had a hasty conference with the governing committee of the Stock Exchange, and counseled an immediate closing of the institution as the only means of allaying the excitement. The members of the Exchange saw the necessity of prompt action, and at once adopted a motion to close the Exchange until the further order of the president, and it was thereupon closed at fifteen minutes to 12 o'clock—all dealings outside the board being prohibited under penalty of expulsion. This action, hitherto unprecedented in the history of the Exchange, was timely, for had the board remained open until the regular hour of closing, doubtless hundreds of brokers would have been ruined, for almost every other transaction was made "under the rule," showing an inability to receive or deliver stocks heretofore unparalleled.

The following table shows the extreme fluctuations of active railway and miscellaneous shares, and also of government bonds made during the week ending Saturday, since which there has been no meeting of the board.

	Wed.	Thurs.	Fri.	Sat.
U. S. 6s, cou. '81	..	..	115½	115¼
U. S. 5-20 con. '62	..	113¾	..	..
U. S. 5-20 cou. '64	..	..	..	..
U. S. 5-20 con. '65	115¾	..	115	..
U. S. 5-20 con. '65 new	..	..	..	..
U. S. 5-20 con. '67	..	..	..	115¾
U. S. 5-20 con. '68	116	..	..	..
U. S. 10-40 cou	..	..	..	..
U. S. new 5s	..	..	..	111½
U. S. cur. 6s. (Pacifics)	112¾	..	..	110¾
Tennessee 6s	..	..	..	..
Tennessee 6s. new	81	81	..	..
N. Carolina 6s	..	..	..	..
N. Carolina 6s. new	..	..	..	..
S. Carolina 6s	..	..	..	..
S. Carolina 6s. new	..	..	..	..
S. Carolina 6s. A & O	..	..	..	..
Louisiana 6s	..	..	..	..
Louisiana Levee 6s	55	..	..	..
Louisiana Levee 8s	57	..	..	..
Virginia 6s	..	..	..	..
Virginia 6s. new	..	..	..	..
Missouri 6s	..	..	..	..
N. Y. Cen. & Hud. Con	103⅝	97¼	93¾	91
Harlem	..	..	95	103
Erie	55¼	50¼	53¼	..
Lake Shore	90¾	89¼	85	83
Wabash	57¾	54¼	43	46
Pittsburgh	85¾	..	80	80
Northwestern	55	53½	41	41
Northwestern Pref	..	74½	..	..
Rock Island	102¼	100	90	90
Fort Wayne	..	..	..	..
Milwaukee and St. Paul	44	42	35½	30
Milwaukee & St. Paul, Pf.	67¾	..	64	..
Ohio and Miss	36¾	35½	28	27¼
Del., Lack & West	98	97¼	88	89
Michigan Central	..	..	..	83
Col. Chi. & Ind. Cen	27¾	25¼	21	21
New Jersey Central	102	..	..	..
Morris and Essex	..	..	..	..
B., Hart. and Erie	2½	..	2	..
Union Pacific	23¼	21¾	20	18½
Atlantic and Pacific, Pref.	..	..	..	..
Han. and St. Joseph	31¾	30½	27	23
Han. and St. Joseph, Pf.	..	..	..	..
New Jersey Southern	..	..	..	..
Canton	83	..	..	..
West. Union Tel	83¾	81	71	59¾
Pacific Mail	42½	40¾	36½	34¾
Quicksilver	30	28	..	..
Quicksilver Pref	..	..	..	..
Consolidation Coal	..	50¾	45	..
American Coal	..	..	..	..
Maryland Coal	..	22	..	..

The gold market has been very steady, all things considered. The following comparison of highest and lowest daily quotations will show the course of the market:

	Highest.	Lowest.
Thursday	112⅞	111¾
Friday	113⅜	111¾
Saturday	112⅝	111⅜
Monday	112	112
Tuesday	112¼	111⅞
Wednesday	112⅜	111⅞

The bond market has been regulated solely by the Treasury purchases to relieve Wall street.

TO-DAY.

The situation to-day was in some degree improved, owing to the abatement, in part, of the wild excitement prevailing yesterday, but the anxiety is general and painful. But one new suspension has been announced in Wall street, and that is of the widely known and highly respectable banking firm of Howes & Macy. Their suspension is a precautionary measure. The Associated Banks are firm in their resolve not to suspend, and the spirit which animates them is to fight it out to the very last, confident in their ability to carry the mercantile community through. With the close of business there are signs of encouragement. The banks stand united and strong. They are resolved not to suspend, and when that fact is appreciated fully by business men, confidence will be restored in them. They have utilized $10,000,000 more of their assets for use in place of legal tender notes in the settlement of Clearing House differences. To-day, of this $10,000,000 certificates authorized, $3,000,000 were issued. Their action amounts to an issue of $30,000,000 legal-tenders, so far as Clearing House settlements are concerned. This is the basis for $80,000,000 loans, if used as such a basis, and if it is not necessary to pay out the legal-tenders to frightened depositors. The government has given no response to the request of the banks to redeem the fives of 1874, due the first of next January. All that the government has done has been to buy $11,883,000 5-20 bonds, of which $2,611,750 were got to-day. The government is slow, but that is now expected.

Foreign exchange is unquotable.

The following show the movements in foreign trade for the week:

IMPORTS.

	1871.	1872.	1873.
Tot. for week	$8,509,299	$9,071,599	$6,773,846
Prev. reported	277,918,699	317,120,553	290,535,362
Since Jan 1	$286,427,998	$326,192,152	$297,309,208

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods	30	$3,890
Bismuth	1	733
Bronzes	87	27,437
Chains and anchors	160	6,509
Copper	..	8,952
Cutlery	125	39,034
Guns	272	25,147
Hardware	94	10,010
Iron, pig, tons	884	30,609
Iron, sheet, tons	100	18,608
R. R. bars	7,542	115,644
Iron, tubes	235	719
Iron, other, tons	311	21,244
Lead, pigs	1,280	8,609
Metal goods	316	36,118
Nails	20	2,209
Needles	10	6,003
Old metal	..	4,880
Plated ware	2	540
Per. caps	6	1,540
Saddlery	3	589
Steel	1,977	31,006
Silverware	2	649
Tin, boxes	70,269	187,501
Tin, 2890 slabs	lbs. 139,619	39,753
Wire	165	4,680

EXPORTS, EXCLUSIVE OF SPECIE

	1871.	1872.	1873.
For the week	$4,228,364	$5,983,128	$6,501,318
Prev. reported	163,228,613	156,503,554	202,171,969
Since Jan. 1	$167,456,977	$161,786,682	$208,673,287

EXPORTS OF SPECIE.

Total for the week	$500,481
Previously reported	40,425,725
Total since January 1, 1873	$40,926,206

LIST OF SUSPENSIONS.

The following is a list of the suspensions reported up to Wednesday night, most of which are declared to be only temporary:

PRIVATE BANKERS AND BROKERS IN NEW YORK.

George B. Alley & Co.
Beers & Edwards.
Brown, Wadsworth & Co.
Theodore Berdell.
Henry Clews & Co.
Clews, Habicht & Co., London.
W. E. Connor.
Jay Cooke & Co.
Day & Morse.
Fisk & Hatch.
Fitch & Co.
Fearing & Dellinger.
Greenleaf, Norris & Co.
Hay & Warner.
Edward Haight & Co.
Howes & Macy.
Eugene J. Jackson.
Lawrence Joseph.
Amos M. Kidder.
Kenyon Cox & Co.
Ketchum & Belknap.
Jacob Little & Co.
W. G. Moorehead & Co.
Miller & Walsh.
Peter M. Myers & Co.
Marvin & Brothers.
Thomas Reed & Co.
E. D. Randolph & Co.
S. H. Smith & Seaver.
Saxton & Rogers.
Taussig, Fisher & Co.
Vernam & Hoyt.
W. H. Warren.
White, Defreitas & Rathborne.
Whittemore & Anderson.
Charles G. White & Co.
Williams & Bostwick.

CORPORATIONS IN NEW YORK.

Bank of the Commonwealth.
National Trust Company.
Union Trust Company.
Midland Railroad Company.

SUSPENSIONS IN PHILADELPHIA.

Charles P. Bayard.
H. H. Bull.
E. W. Clarke & Co.
De Haven & Brother.
Henry H. Douglass.
Henry L. Fell.
Gelbough, Bond & Co.
T. C. Knight.
John P. Lloyd.
George H. North.
J. S. & H. E. Yerkes.
Union Banking Co.
Citizens' Bank (State.)
Union Bank (State.)

MISCELLANEOUS.

Thomas Squires & Son, Albany, N. Y.
Horace Conn, Woburn, Mass.
Franklin Banking Co., Chicago, Ill.
Taussig, Fisher & Co., St. Louis, Mo.
Powell & Co., Williamsport, Pa.
H. J. Morse & Co., Toronto, Canada.
City Savings Bank, Burlington, Iowa.
First National Bank, Washington, D. C.
H. W. Burt & Co., Buffalo, N. Y.
James T. Brady & Co., Pittsburgh, Penn.
Merchants' National Bank, Petersburg, Va.
Planters' & Mechanics' Bank, Petersburg, Va.
People's Bank, Petersburg, Va.
First National Bank, Petersburg, Va.
National Trust Co., Pittsburgh.

GENERAL HARDWARE.

At our last writing the Hardware trade was in a very satisfactory condition, and the prospects of the fall business were quite good. Since then the panic in Wall street has interfered to induce caution on the part of buyers, and for the last two or three days the amount of orders has not come up to the average. Remittances, too, have been less than before. While the trouble in Wall street has come with a suddenness never equaled in any previous crisis, there is good reason to believe that the commercial and manufacturing interests of the country will be less affected than in former panics which began less violently. For more than a year the Hardware and Iron buyers have been operating very carefully, and, as a rule, entirely within their means, as was naturally the case in a falling market. Beside, the alarm of coming financial trouble has been constantly heard for some months, which has made people more careful to keep their obligations within bounds than they might otherwise have been. The feeling is universal that the commercial classes generally are in very good shape, and that no very wide-spread disaster can come upon them at present. The panic has been so far confined to stock brokers and to those bankers whose means have been absorbed in promoting railroad speculation. The failure of a trust company whose secretary proves to be a defaulter to a large amount gave a great shock to public confidence, and the suspension of a national bank, never well managed, which had allowed a former president to overdraw his account to the extent of $225,000, made the panic greater. That bankers who agree to pay four per cent. interest on deposits should be unable to stand such a run as they were subjected to, is not to be wondered at. Indeed, it seems to us quite unreasonable to expect any banker to pay such interest and yet be able to keep his funds in such shape that he can pay any large proportion of them in a sudden emergency. The trouble here has been that there is, for the time being, no market for even the best securities, unless at ruinous figures far below what they are universally conceded to be worth. The Union Trust Company had and were endeavoring to sell $1,000,000 of 5-20 bonds when they were compelled to suspend. Most of the suspended firms are in possession of securities quite ample to pay their liabilities when they can sell them, but there is no market for them now.

We learn from our English exchanges that a Mr. T. D. Worrall is now in Birmingham upon what, all things considered, seems to be a very foolish errand. The *Ironmonger* thus represents the views of this gentlemen, and explains the nature of his errand:

He objects, on the part of Mississippi, to "the exorbitant charges of New York jobbers," and aims to establish a direct sea trade between his own locality and Great Britain. The bulk of the Mississippi trade, he says, has hitherto been done in New York, and desperate efforts have been put forth by the citizens of that and other Eastern cities to monopolize this trade. Part of their plan has been to get possession of the foreign trade, so that they could control it in their own interests, and through lack of information on the part of British manufacturers and merchants they have been singularly successful. They have in consequence practically driven English manufacturers out of the market; they have taken advantage of their control of the government to impose excessive tariffs on all foreign goods; and by doubling the price of all they touch, have made it possible for Eastern manufacturers to undersell their British competitors. Neither the tariffs alone, nor the excessive charges of middle-men, nor the freight charges on over 1500 miles of railway, could keep English manufacturers out of the market; but all combined are too much for them. This is not all; but in consequence of nearly everything that is sent from Europe going to New York, it becomes necessary for the Western farmers and Southern planters to send grain, produce, and staples to New York to meet the ships. Here, again, the Eastern people get a picking in elevator charges, warehouse charges, freight charges, brokerage, exchange, &c. Thus, he maintains, "the interests of the great producers of the Mississippi Valley and the manufacturers of England, are perfectly identical;" and he forthwith propounds his scheme for bringing the two parties into direct contact. "Let," he says, "your manufacturers give us samples of all the articles they manufacture, as far as these can be shown by samples. The object of this is to afford our merchants an opportunity of knowing where and of whom to order goods, so that they can get them without the interposition of middle-men in New York, and without the necessity of paying overland freights. These samples will be deposited in a public museum in New Orleans, without charge to the manufacturers, and will stand as a lasting advertisement for the benefit of all who send them. So soon as it is known that the whole manufactures of England are represented there, thousands will visit the place, and in consequence, instead of sending to New York, both orders and cash will be sent directly to the original manufacturers or their accredited agents. I can find plenty of ships ready to embark in the trade, provided outward-bound freights can be secured. The solution of the whole difficulty rests, therefore, with the manufacturers."

We need hardly waste space in showing the unreasonableness of his proposition. In time, it may be, the foreign trade of the Mississippi Valley will be all done at New Orleans, but no one who knew anything of what he was talking of would state the case as he does, or propose that manufacturers should place their goods in one great "public museum," where the goods would be expected to sell themselves to customers who thronged there of their own accord, and would, we suppose, send the cash in advance with their orders.

The Hart, Bliven & Mead Mfg. Co. will shortly issue a circular giving the changes in discounts from their sheet of July 1, 1873. The following are the changes in goods of their own manufacture:

Page.	Dis. per cent.
16 to 42, all articles named on these pages	50
43, Brass Door Buttons	50
43, Figured Enameled Door Buttons, Nos. 4 & 5	33⅓
43, add Figured Enameled Door Buttons, without Plates, No. 1, 1¼ in., $4 gross	33⅓
43, add Figured Enameled Door Buttons, without Plates, No. 2, 2 in., $5 gross	33⅓
43, add Bronzed Metal Door Buttons, on Plates, No. 04, 1¾ in., $22 gross	33⅓
43, add Bronzed Metal Door Buttons, on Plates, No. 05, 2 in., $32 gross	33⅓
43, Japanned and Brass Door Buttons, on Plates	50
44, Brass Screw and Drive Hooks	50
129, 130, Iron Fire Dogs	50
131, Brass Top Heavy Fire Dogs	50
131, Figured Enameled Fire Dogs	55
132 to 145, all articles named on these pages	50
146, all Coal Shovels on this page	45

They also say:

We shall issue an appendix to our new Catalogue of 1873 about January 1st, 1874, nicely illustrated, which will represent the following and other new goods made at our works:

Bronze Metal Barrel Bolts—3, 4, 5 inches.
" " Square Door Bolts—3, 4 inches.
" " Chain Bolts—3, 4, 6, 8 inches.
" " Flat Cupboard Bolts.
" " Cupboard Latches.
" " Cupboard and Closet Catches.
" " French Window Catches.
" " Cupboard Turns.
Figured Enameled Raised Door Buttons, without plate, 1¾ and 2 in.
Bronze Metal Raised Door Buttons, on plates, 1¾ and 2 in.
Bronze Metal Hat and Coat Hooks.
Figured Enameled Hanging Basket or Bird Cage Hooks.
Figured Enameled Paper Clips and Files, new sizes.
Bronze Metal Paper Clips and Files, new sizes.
" " " Weights, new styles.
Figured Enameled Paper Weights, new styles.
No. 00, 1¾ in., City Frame Pulleys, Noiseless.
Figured Enameled Sash Locks and Lifts.
Bronze Metal " "
" " Sash Lifts.
" " Shutter Bars.
" " Sash Fasteners.
" " Drawer Pulls.
" " Door Pulls, medium sizes.
" " Bank Door Pulls, large sizes.
" " Oblique Door Handles.
" " " " with latch.
Figured Enameled Shovel and Tongs Stands, new styles.

The Russell & Erwin Mfg. Co., under date of 20th instant, publish the following list of Sleigh Bells for the coming season. Their circular also contains prices of Barney & Berry's Skates, and their own brand of Shovels, Spades and Scoops:

SLEIGH BELLS.

Polished Round Bells.

No.	00	0	1	2	3	4	5	6
	$0·22	·25	·28	·37	·50	·60	·70	·80
No.	7	8	9	10	11	12	13	14
	1·00	1·15	1·36	1·60	1·80	2·16	2·56	3·20

Polished Open Bells.

No.	00	0	1	2	3	4	5	6
	$0·40	·45	·55	·68	·96	1·24	1·65	2·20

Russet Leather Body Straps.—Polished Bells.

No. 3—48	No. 1	R'd Bells and 11 Open Bells, asst.	$2·75
4—48	" 1	" 11 R'd Bells, asst.	2·70
9—30	" 1	" 11 " "	1·75
10—30	" 1	" 11 Open Bells, asst.	1·80
33—36	" 1	"	1·80
34—36	" 2	"	2·00
35—30	" 2	"	1·95
37—30	" 3	"	2·25
35—30	" 2	" White Metal	2·05
37—30	" 3	"	2 37

Russet Leather Neck Straps.—Polished Bells.

No.	179	181	182	184	185	186
Bells.	11	11	11	13	13	13
Asst.	3 to 8	5 to 10	6 to 11	3 to 9	4 to 10	5 to 11
	$1 20	1·63	1·88	1·50	1·70	1·88
No.	189	190	191	212	213	214
Bells.	15	15	15	19	17	15
Asst.	3 to 10	4 to 11	5 to 12	1 to 10	1 to 9	1 to 8
	$1·75	2·06	2·35	1·98	1·65	1·25

No	$.5	216	217
Bells	13	11	9
Asst	1 to 7	1 to 6	1 to 5
	$1·00	·85	·75

FANCY BODY STRAPS.

Patent and Enameled Leather—Bound Edges.

NOTE.—All the Bells on Fancy Straps are Riveted on.

Common White Metal Bells.

No.	343	346	347	349
Bells.	30 No 1	36 No. 1	30 No. 2	30 No. 3
	$2·75	3·00	3·00	3·25

Fine Polished White Metal Bells.

No.	291	292	293	294
Bells.	36 No. 3	30 No. 3	36 No. 2	30 No. 2
	$4·10	3·50	3·75	3·00
No.	295	296	297	
Bells.	48 No. 1	42 No. 1	36 No. 1	
	$3·20	2·95	2·65	

Extra Silver Plated Bells.

No.	253	254	255
Bells.	30 No 3	36 No. 2	30 No. 2
	$4·88	4·70	4·31
No.	256	257	258
Bells.	48 No. 1	42 No. 1	36 No. 1
	4·50	4·25	4·00

CHASE'S PATENT BODY STRAPS.

Polished Harness Leather—Leather Bound.

No. 547—30	No. 2	Fine Pol. White Metal Bells	$4·33
548—36	" 2	" " " "	4·74
550—30	" 3	" " " "	4·95
651—30	" 2	Extra Silver Plated Bells	5·38
652—36	" 2	" "	6·00
653—42	" 2	" "	6·68
655—30	" 3	" "	6·00

Discount on all the foregoing Bells, 20 per cent. Particular attention is called to the low list we use on all Bells.

Extra Fine Body Straps—Highly Finished.

No. 0253—28	No. 3	Extra Fine Gilt Bells	$10·00
0255—30	" 3	" "	10·00
0258—36	" 1	" "	10·00

Discount, 40 per cent.

"DEXTER" BODY STRAPS.

No. 142—Best Harness Leather, Bound, 42 No. 2 Gilt or Plated Bells	$22·00
No. 150—Best Harness Leather, Bound, 50 No. 2 Gilt or Plated Bells	24·00
No. 242—Best Harness Leather, Bound, 42 No. 2 Gilt or Plated Bells	16·00
No. 250—Best Harness Leather, Bound, 50 No. 2 Gilt or Plated Bells	18·00
No. 330—Harness Leather, Bound, 30 No. 2 Fine White Metal Bells	7·89
No. 336—Harness Leather, Bound, 36 No. 2 Fine White Metal Bells	8·85
No. 430—Harness Leather, Cloth Bound, 30 No. 2 Fine White Metal Bells	6·71
No. 436—Harness Leather, Cloth Bound, 36 No. 2 Fine White Metal Bells	7·49

The Bells of the Dexter Strap are stamped from sheet metal. Discount, 40 per cent.

Bradford & Anthony, Boston, Mass., have issued the following lists for Winslow's Wood Top Skates, and Forbes' Patent Acme Club Skates for the season of 1873. They also publish their list for Barney & Berry's Skates, which is the same as has already appeared in these columns. The following are their terms for Winslow's Skates:

For amounts under $100		Net.
" " over $100, discount	10	per cent.
" " " $500, "	15	" "
" " " $1000, "	20	" "

Patent Acme and Barney & Berry's Skates are list net.

WINSLOW'S SKATES.

	Per pair.
No. 95, Open Runner, Sizes 7 to 11 inches	$ ·75
No. 100, Open Runner, Sizes 7½ to 10½ inches	·85
No. 140, Open Runner, Sizes 8 to 11 inches, Rocker	1·10
No. 200, Solid Runner, Sizes 7 to 11 inches	·95
No. 245, Sizes 8 to 11 inches, Half Rocker.—Varnished Beech Woods, Solid Runners, fastened in a secure manner to the woods by a Brass Thimble, a device which ingeniously and effectually prevents the breaking or splitting of the woods. Heel Screw	1·25
No. 250, Sizes 8 to 11 inches, Rocker.—Varnished Beech Woods, Solid Runners, finished in same manner and fastened with Brass Thimbles, as in No. 245	1·25
No. 295, Sizes 8 to 11¼ inches, Half Rocker. Solid Cast Steel Blades, French Polish Beech Woods	1·75
No. 300, Sizes 8 to 11¼ inches, Rocker.—Solid Cast Steel Blades, French Polish Beech Woods	1·75
No. 325, Sizes 8 to 11 inches, Half Rocker.—Solid Welded Hardened Steel Blades, Varnished Beech Woods, Screw Heel, Runners fastened by Brass Thimbles, effectually securing the wood against splitting, making a strong and stylish Skate	2·00
No. 330, Sizes 8 to 11 inches, Rocker.—Solid Welded, Hardened Steel Blades, same quality and finish as No. 325. A most desirable pattern	2·00
No. 455, Sizes 8 to 11 inches, Half Rocker.—Polished Beech Woods, Solid Welded, Hardened Steel Blades, Brass Center, Heel and Toe Plate, Runner fastened with Brass Thimbles, making one of the strongest Skates, and embracing all the good points required	3·00
No. 460, Sizes 8 to 11 inches, Rocker.—Polished Beech Woods, Solid Welded, Hardened Steel Blades, Brass Center, Heel and Toe Plate, Runners fastened with Brass Thimbles. This is one of the most desirable Skates on the list. Has no equal in the market for style, quality and finish, at the cost	3·00
No. 665, Sizes 8 to 11 inches, Black Ebony Finished Half Rocker.—Solid Welded, Hardened Steel Blades, German Silver Center Heel and Toe Plates, style same as No. 455	4·00
No. 670, Sizes 8 to 11 inches, Black Ebony Finished Rocker.—Solid Welded, Hardened Steel Blades, German Silver Center, Heel and Toe Plates, style same as No. 460	4·00
No. 675, Sizes 8 to 11 inches, Rosewood Half Rocker. — Solid Welded, Hardened Steel Blades, German Silver Center, Heel and Toe Plates, style same as No. 455	4·00
No. 680, Sizes 8 to 11 inches, Rosewood Rocker. —Solid Welded, Hardened Steel Blades, German Silver Center, Heel and Toe Plates, style same as No. 460	4·00

GENTS' FRAME SKATE.

No. 275, Lengths 7 to 11 inches, Steel Blade, Standard.—French Polish Beech Woods, Screw Heel, Strapped complete, with Broad Toe Straps and Narrow Heel Straps. All Strapped	2·25
No. 400, Lengths 8 to 11 inches.—A new and stylish pattern for Gentlemen who prefer a strapped Skate for security to the foot, rather than the Clamp Fastening. Cast Steel Runners, Polished Beech Woods, Brass Toe, Heel and Cross Plate. Without Straps	2·75

LADIES' SKATES.

No. 220, Sizes 7 to 10 inches	1·20
No. 270, Sizes 7½ to 10 inches.—Ladies' Skate. New Pattern	1·50
No. 274, Lengths 7 to 10 inches, Ladies' Standard, Frame, Steel Blades.—French Polish Beech Woods, Strapped complete, with Brass Heel Pieces, and Mortised Toe Straps, Patent Buckles, Black Leather Trimmings	2·25
No. 276, Lengths 7 to 10 inches, Ladies' Frame, Standard, Steel Blades.—French Polish Beech Woods, Strapped complete, with Silver-plated Heel Pieces, and Mortised Broad Toe Straps, Patent Buckles, Black Leather Trimmings	2·40
No. 280, Lengths 7 to 10 inches, Ladies' Frame, Standard, Steel Blades—French Polish Beech Woods, Strapped complete, with Silver-plated Heel Pieces, and Mortised Broad Toe Straps, Patent Buckles, Russet Leather Trimmings	2·50

LADIES' RINK SKATE.

No. 382, Sizes 8 to 10 inches, Cast Steel Runners, Polished Beech Woods, Black or Russet Leather Straps, Patent Buckles	3·00
No. 384, Sizes 8 to 10 inches, Ladies' Rink Skate.—Ebony Woods, Silver Trimmings, Black or Russet Leather Straps. Same style as No. 382	3·50
No. 272, Sizes 7 to 10 inches, Ladies' Standard, Frame, Steel Blades.—French Polish Beech Woods, Strapped complete, with Brass Heel Pieces, and Mortised Broad Toe Straps, Black Leather Trimmings, Runners either grooved or flat	2·10

FORBES' PATENT ACME CLUB SKATES. Net.

No. 5.—This is the cheapest Skate made. The Runners are made of all Steel and not hardened, and the working parts are equally reliable with the best, although not so well finished. 3·40

No. 7.—The runners of these are made of Welded Iron and Steel of the best quality, and thoroughly hardened and tempered, and they are pronounced the very best Skate made in every respect. 4·50

No. 10.—This number is same quality as No. 7, with the tops and runners Electro Nickel Plated. This improves the appearance and insures freedom from rust. 6·25

No. 12.—These are same quality as No. 7, but with tops and runners Electro Silver Plated, and have a very handsome appearance. 7·00

No. 14.—These also are similar in quality to No. 7, with the runners Electro Silver Plated, and the tops Electro Gold Plated. They surpass in appearance any Skate ever made. 7·50

Trade in foreign Hardware has suffered somewhat from the excitement in financial circles, but we hear of no weakening of values; on the contrary, Coil Chain and Traces, which for some time have been stiffening, are now quoted at a slight advance on the figures of last week. We quote 6¼-10-2 Traces at 62 cents, gold, and the following list for Coil Chain, which is an advance of a quarter of a cent on previous figures:

13¼	10	9¾	8¾	8¼	8¼ cents. gold.
3-16	¼	5-16	⅜	7-16	⅜ inch.

Peter Wright's Anvils are in short supply, and holders ask 12¼ cents per pound, gold, for sizes under 250 pounds, and 12¾ cents per pound for 250 pounds and over. Wilson's Butcher and Shoe Knives are in fair request, and are offered at discount 15 @ 20 per cent. from list. The market for German Halter and Coil Chain remains in the unsettled condition previously noticed, and our quotation is only nominal.

There is a fair trade doing in Nails, which are firm at $4·50, net, for 10d. It is a curious feature of the trade at present that the buyer of a large lot can obtain no concession from the figures at which the small trade are supplied.

W. & B. Douglas, Middletown, Conn., have been awarded the grand medal of progress at the Vienna Exposition, being the highest award on Pumps, etc. The branch houses of this establishment are at 85 and 87 John street, New York, 197 Lake street, Chicago, and 124 Walnut street, Cincinnati, where samples of their goods can be seen.

IRON.

As a natural result of the panic in the money market which has prevailed throughout the past week, business has been checked in all branches of the Iron trade, though so far its effect directly on the Iron interest has been little felt. In all times when money is stringent goods are obtainable for cash below the current market, and there has been offerings in this way at shaded figures, but generally prices all rule about the same as last week, though more or less nominal in absence of business. Little disposition has been manifested by holders or buyers to operate, all parties appearing desirous of awaiting a more favorable turn to affairs. The trade has been very prosperous during the past two years, and, as an interest, the Iron men are well able to stand the effects of the present trouble. The prospect of the market in the immediate future, however, is rather gloomy, although it is yet rather early to form any decided opinion. In regard to Iron Rails, it is agreed that the demand will fall off, and that prices must be lower. Many existing contracts for Rails and rolling stock have been already cancelled. Late advices from Locomotive works and mills report a large reduction of hands, and, in many cases, a reduction, or proposed reduction at end of month, of 10 or 15 per cent. in rates of wages. Further, many new roads in course of construction have been paying for material and labor in bonds, which, in the present uncertain condition of railway securities, cannot be negotiated, and they will probably be compelled to furnish cash, or work will have to be stopped until such a time as the roads will be actually needed, and the local traffic of the district through which they run be heavy enough to enable them to pay expenses. If this should prove to be the case, the consumption of Rails will necessarily show a large falling off, and the effect be severely felt by the rolling mills, many of which may temporarily, at least, be compelled to suspend operations.

American Pig.—The market for American Iron has become extremely dull, and values wholly nominal in absence of business. Considerable caution is manifested by holders, and they show little, if any, disposition to operate, appearing to think that for the present it is safer to hold their goods. A few lots have changed hands for cash, that were forced on the market for the purpose of realizing, but prices generally in the present condition of affairs are uncertain, and quotations, therefore, are of little use. Sales include 200 tons No. 2 extra

at Hoboken at $34, and 200 tons No. 2 at a private price. Also 2000 tons Gray Forge at $30 and $30·50 at furnace. We quote No. 1 extra, $42 @ $44.

Scotch Pig.—Little trade has been going on in Scotch Iron, and prices are nominal, though holders appear confident in their views. The stock here is very limited, and little to be expected, as importations cannot be effected except at a material loss. Holders ask about $51 @ $51·50 for Coltness, $50 for Gartsherrie, $47 for Summerlee and Glengarnock, and $46 for Eglinton. Sales include 50 tons Eglinton, 200 tons Glengarnock on private terms, and a small lot Gartsherrie, at $50.

Following are the prices of Scotch Pig Iron in Glasgow, as reported by Messrs. J. E. SWAN & BROS., under date of Sept. 5:

	No. 1	No. 3	No. 4
Gartsherrie	132 6	125/	....
Coltness	140/	122 6	....
Summerlee	127 6	116/	117/6
Langloan	130/	117 6	....
Govan	120/	116/	117/6
Calder	*130/	117/6	....
Shotts, Bessemer	165/	160/	....
do Ordinary	127 6	117/6	....
Carnbroe	125/	117/6	120/
Wishaw	120/	117/	115/
Monkland	120/	116/	....
Chapelhall	125/	....	....
Clyde	120/	116/	117/6
Quarter—Clyde	120/	116/	117/6

Glasgow Warrants 3-5, No. 1; 2-5, No. 3, g. m. b. 116/.

*f. o. b. Glasgow, 1/ per ton, extra.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock, Ardeer	125/	120/	..
Eglinton, Lugar, Muirkirk, Portland, Dalmellington	Branded Eglinton 120/	118/	119/
Dalmellington	120/	117/6	115/

CURRENT RATES OF FREIGHT ON PIG IRON.

To	From Glasgow.	From Ardrossan.
New York	7/6	7/6
Boston	17/	17/
New Orleans	20/	20/
Baltimore	17/	17/6
Philadelphia	16/	16/
Providence	20/	15/

Bar.—The market for Refined from store is also very dull and transactions limited to a few lots wanted to fill urgent requirements.

Rails.—The market for all descriptions of Rails, both old and new, is unsettled, and values uncertain. We understand that large lots in U. S. warehouses, (duty not paid), in name of bankers, have been transfered to the agents of the roads.

Scrap.—No transactions are reported, and the market is wholly nominal.

METALS.

The financial troubles of the past week have had little effect on the different branches of the Metal trade beyond bringing trade in all articles to a complete stand. At the beginning of the panic a few small lots of Copper were forced on the market by holders who were compelled to realize, and sold for cash at a trifle reduction, but since there does not appear to be any disposition to operate upon the part of either buyers or sellers. Values of all other descriptions are nominal, though naturally heavy and depressed.

Copper.—The transactions in Ingot will foot up about 500,000 lbs., all early in the week, at 25½c. @ 26½c., mostly at 26c. @ 26¼c., cash. Futures have been very quiet, and without business; holders, however, are generally steady at 27c., and do not appear anxious to realize. Manufactured Copper and Yellow Metal Sheathing have ruled dull, but values remain nominally steady. We quote at 40c. for Bolts and Braziers, 38c. for New Sheathing, 45c. for Nails, 26c. @ 27c. for Old Sheathing, 27c. for Yellow Metal Sheathing, 32c. for Yellow Metal Bolts, and 27c. @ 30c. for Yellow Metal Nails, Sheathing, etc.

Tin.—Very little business has been doing in Pig Tin since our last, and values are wholly nominal. Straits are held at about 30¾c. @ 31c., gold; English 28c. @ 28¼c., gold; and Banca 34c., gold. The only transactions we hear of have been small lots English L. and F., say, about 5 tons all told, within the range given above. Tin Plates have also ruled quiet, though little, if any, change has taken place in the value. We quote: I. C. Charcoal, $10·50 @ $10·75; I. C. Coke, $8·50 @ $9; Charcoal Terne, $9·87½ @ $10·25; and Coke Terne, $7·50 @ $8·50.

Lead.—Both foreign and domestic Pig are quiet, though prices nominally are held firm. Sales have been made of small lots to suit urgent wants, say, in all, about 100 tons, on a basis of previous prices. We quote at the close at 7c. for Spanish and German ordinary; 7c. for English; 7¼c. @ 7⅝c. for foreign refined, and 6⅝c. @ 6¾c. for domestic, all gold. Manufactured Lead is firmly held. We quote at 9¼c. for Bar, 10½c. for Sheet and Pipe, and 16½c. for Tin Lined Pipe, less the usual discount to the trade.

Spelter and Zinc.—Foreign Spelter is inactive, but prices rule firm in sympathy with advices from abroad, which indicate active markets and strong prices, with stocks very light. We quote at 7⅝c. @ 7⅝c., gold, according to brand. Sales, 10 tons at 7⅝c., and 10 tons at 7⅝c., gold. In domestic plates there has been a fair movement at full prices, with sales including 100,000 lbs. Western at 8¼c., currency. Sheet Zinc is dull, but steady, at 10c., less 4 per cent., gold, from agents' hands.

Antimony.—Regulus has been neglected, and the value wholly nominal at 13¾c. @ 13½c., gold.

PHILADELPHIA.

Messrs. BLAKISTON & COX, 333 Walnut street, under date of Sept. 23 report as follows: *American Pig.*—We quote No. 1 Foundry at $42 to $44, No. 2 Foundry at $35 to $37, Gray Forge at $31 to $33, delivered free here. Good No. 1 Foundry Carbonized Iron is held at low figures, but is not in large stock. The recent financial troubles, it is thought, will not affect business to any great extent, beyond for the moment enfeebling prices and causing a decrease in the inquiry. The after effect will be to make trade brighter, and tend to firm prices, as is always the case after disturbances in the money markets of the country. Scotch Pig is in small demand, and has resumed the quotations of a month ago—Eglinton at $45, Glengarnock at $47 to $48 for 50 ton lots from yard. Bar Iron sells at 3·8c. from store, and 3·6c. from mill. Old Rails are held in yard at $47 to $48.

PITTSBURGH.

PITTSBURGH, Sept. 20.—The demand for Pig Iron, although it is still confined mainly to supplying immediate wants, is steadily increasing, and while there has been no advance in prices, there is, as might be expected, a firmer feeling. Producers begin to feel assured that there will be at least an average demand during the fall and winter for their product, although it is claimed that they (we refer to those in the Mahoning and Shenango valleys) are losing from $2 to $2·50 per ton at present prices, and it is said there is a loss of from $4 to $5 on Eastern Irons. It is possible that there may be an advance, but it is not expected, and the indications generally do not warrant higher rates. It is claimed by mill men that Pig is still higher, relatively, than the product, and as long as this is the case it is not reasonable to expect an advance in the former. The fact that consumers generally are buying sparingly indicates that they do not anticipate an upward turn in the market. Otherwise, if they thought prices were likely to go up, their policy would be to buy largely, and this, as already stated, they are not doing. Choice Mill Irons may be quoted at $34, 4 mos., although there are some few brands that are still held at $35, and cannot be bought for anything less, and sales have been reported this week as low as $32, but no strictly choice Iron can be obtained at this figure. There is a difference of from $2 to $3 per ton in No. 1 Mill, just as there is in No. 1 Foundry; hence there is quite a range in prices. Mottled and White Irons may be quoted at $30 to $32, according to quality. There was a sale of 700 tons Mottled reported at $30·25, cash. Charcoal Irons continue dull, the high price at which it is held, as compared with other Irons, having restricted its consumption. Consumers will not touch it if they can possibly help themselves. It may be fairly quoted at $45 to $50 for warm, and $60 to $65 for cold blast. Blooms continue quiet and unchanged, ranging from $95 to $110, according to quality. The demand for finished Irons continues quite active, and is steadily increasing, and, as might be expected, the market is considerably firmer; however, there has been no general advance as yet. We heard of some few sales this week on a basis of 3¼ for Bars, but there are very few sellers now under 3 4-10, and some of the mills still claim that they have booked no orders yet under this figure. There was a meeting of the association on Wednesday, 17th, but for some reason or other, which has not transpired, it was deemed impolitic to make any change in rates. There is to be another meeting next Wednesday, when it is probable a change will be made. It is expected that the card will be reduced to about 3 6-10 for Bars, which would establish the actual selling price at 3·4. At a meeting of the Nail Association on Wednesday, 17th, the price was again advanced, as predicted in my last letter. The card was put up from $4·37½ to $4·50 per keg, with 12½ cents reduction for 100 keg lots and upward, and two per cent. off for cash—an actual advance of 25 cents per keg within the past three weeks; and, as your correspondent understands it, the advance takes place in Wheeling as well as Pittsburgh. Stocks are very much reduced, and manufacturers are nearly all behind with their orders, although working to their full capacity. The Steel mills are also full of business, but, owing to local causes—there was nothing in the general situation to warrant it—the price of Cast Steel has been reduced half a cent, per lb., and German Steel ¼c. It is expected that as soon as the object aimed at has been accomplished, the price of both Cast and German will be put back to where they were. The fact is all Pittsburgh manufacturing interests seem to be thriving except the Window Glass, in which there is a dead lock, in consequence of the refusal of the workmen to go to work at the reduction in wages demanded by manufacturers.

The *Commercial* of the 20th inst. says: We can report no material change in the market for raw Irons. The inquiry continues about the same as last week, and sales show that buyers are willing to take larger lots than heretofore, but only of such brands as are offered at less than $35, 4 months. The demand for Manufactured Iron and Nails continues very good, and stocks are light. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

700 tons mottled	$30 50—cash
600 tons gray forge	32 00—cash
500 tons gray forge	34 00—4 m.
300 tons gray neutral	34 00—4 m.
200 tons gray neutral	34 00—4 m.
200 tons gray neutral	34 00—4 m.
200 tons gray red short	34 00—4 m.
200 tons white and mottled	34 00—4 m.
170 tons white	34 00—4 m.
120 tons mottled	30 50—cash
100 tons white and mottled	31 00—4 m.
100 tons gray forge	34 00—4 m.
100 tons gray forge	33 00—4 m.
100 tons close gray	32 00—4 m.
100 tons gray forge	33 25—4 m.
100 tons foundry	36 00—4 m.
70 tons close gray	34 00—4 m.
50 tons gray red short	34 00—4 m.
40 tons gray neutral	34 00—4 m.

ANTHRACITE.

400 tons No. 2 cold short	32 00—6 m.
200 tons gray forge neutral	33 00—4 m.
150 tons gray cold short	30 00—4 m.
50 tons extra No. 1 foundry	40 00—4 m.
30 tons extra No. 2 foundry	36 00—4 m.
20 tons No. 2 foundry	33 50—4 m.

CONNELLSVILLE COKE.

200 tons gray forge	33 00—4 m.

BLOOMS.

50 tons Juniata	107 00—cash

CHICAGO.

Since our list of Chicago Metal Prices went to press, we have received the following changes:

TIN PLATE.

Ic, 20x14, Coke	$12·50
Ic, 10x14, Charcoal	13·50
Ix, 10x14, "	16·50
Ic, 12x12, "	14·00
Ix, 12x12, "	17·00
Ic, 14x20, "	14·50
Ix, 14x20, "	17·50
Ixx, 14x20, "	20·50
Ixxx, 14x20, "	23·50
Ixxxx, 14x20, "	26·50
Ix, 14x14, "	28·00
Dc, 100 Plate, "	13·50
Dx, "	16·50
Dxx, "	19·50
Dxxx, "	22·50
Ic, 14x20, Coke, for Gutters	20·50
Ic, 14x20, Charcoal Roofing	13·00
Ix, 14x20, " "	15·50
Ic, 20x28, " "	27·00
Ix, 20x28, " "	32·00

PIG TIN.

Large, 60lb	40c
Small, 30lb	41c
Bar Tin	42c

BOSTON.

SEPT. 20.—The market for refined Bar Iron is steady and moderately active, with sales at somewhat irregular prices, but, on the whole, about within the range of our last week's quotations. Some low Pittsburgh Irons are selling below our figures. Pig Iron is steady and in fair demand, with no material change in prices. Scotch continues very firm. Mail reports from the English markets are to the effect that there is some speculation in Scotch Pig, and a good export demand, but more recently a little easing off from the highest prices. We quote yard lots of American Pig Iron at $45 to $50 per ton, including No. 2 extra at $44 to $46, and No. 1 at $47 to $50. We quote Eglinton at $49 to $50; Coltness at $58 to $60; Gartsherrie, $57 to $59; Charcoal at $60 to $70.—*Com. Bulletin.*

LOUISVILLE.

Mr. GEO. H. HULL, under date of Sept. 22, writes us as follows: Market continues without change, except that the better grades of Iron are in light supply, and firm at full figures. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$48·00 @ 50·00
" 2 " " " "	45·00 @ 46·00
" 1 Forge, " " "	36·00 @ 37·00
" 1 F'dry, from Tennessee Ores	46·00 @ 48·00
" 2 " " "	43·00 @ 45·00
" 1 Forge, " "	36·00 @ 37·00
" 1 F'dry, from Alabama Ores	48·00 @ 50·00
" 1 " " Iron Mountain Ores	50·00 @ 52·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	45·00 @ 46·00
" 2 " " " "	41·00 @ 43·00
" 1 Forge, " "	34·00 @ 35·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @ 62·00
" " Tennessee Ores	58·00 @ 60·00
" " Alabama Ores	60·00 @ 62·00
" " Georgia Ores	60·00 @ 62·00
" " Missouri Ores	58·00 @ 60·00
" " Kentucky	56·00 @ 60·00

CINCINNATI.

Messrs. ADDY, HULL & Co., under date of Sept. 22, write us as follows: The demand for Charcoal Foundry grades continues good, with steady improvement looked for. There is also evident disposition on the part of buyers of Forge Irons to take hold more freely.

HOT BLAST CHARCOAL.

Hanging Rock	No. 1	₩ ton..$47·00 @ 48·00—4 mos.
"	No. 2	43·00 @ 45·00—4 mos.
"	Forge	35·00 @ 36·00—4 mos.
Tennessee	No. 1	44·00 @ 46·00—4 mos.
"	Forge	35·00 @ 36·00—4 mos.
Alabama	No. 1	47·00 @ 50·00—4 mos.
Missouri	No. 1	49·00 @ 56·00—4 mos.
"	No. 2	44·00 @ 45·00—4 mos.

HOT BLAST STONE COAL.

Missouri	No. 1	₩ ton..$46·00 @ 47·00—4 mos.
"	Forge	35·00 @ —4 mos
Ohio	No. 1	42·00 @ 44·00—4 mos.
"	Forge	34·00 @ 35·00—4 mos.
Scotch Pig, No. 1		

COLD BLAST CHARCOAL.

Hanging Rock	Car Wheel	₩ tn.$60·00 @ 65·00—4 mos.
Missouri	" "	60·00 @ 62·00—4 mos.
Kentucky	" "	58·00 @ 60·00—4 mos.
Tennessee	" "	58·00 @ 60·00—4 mos.
Georgia	" "	60·00 @ 63·00—4 mos.
Alabama	" "	60·00 @ 63·00—4 mos.
Machinery and Forge		58·00 @ 60·00—4 mos.
Blooms		112·00 @ 115·00—4 mos

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices, under date of Sept. 23, 1873: Business is somewhat depressed, owing to disarrangement in finances, and orders are cautiously issued. We note decline in Cast Steel of one-half cent per pound. Remainder of list unchanged.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	3¾c. to 4c. per lb.
1 to 4½ wide by 1½ to 2 thick	3¾c. to 4c. per lb.
Round and square, ordinary sizes, from ⅝ to 2 inclusive	3¾c. to 4c. "
Hoop Iron, 1½ wide and upward	5¼c. per lb.
Band Iron, from 1¾ to 4 in. wide	4¼ to 4¾c. "
Horse Shoe Iron ⅝ to 1 wide by ⅜ to ⅝ thick	5 to 5¾c. "
Norway Nail Rods	8¼ to 8¾c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16½c. "
Machinery Steel	11½c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$6·37½
" Mule Shoes " "	7·37½

Common Horse Nails, from 14c. to 18c per pound.

10	9	8	7	6
23	24	25	26	28c. per lb.

Putnam Horse Nails..5¼ by 9-16 at 4¾c. to 5c. per lb.
R. R. Spikes

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of Sept. 6, 1873, report:

Metals.—The interest attached to this market, as a fair index to the general trade of the country, has this week been increased by the very satisfactory revival which has taken place in the demand. The amount of business transacted in every department of the Iron trade has been larger than of late, and, with the one exception of dear fuel to act as a deterring cause, the occasion seems likely to remove the gloom which had overspread the market, and lay the foundation for a winter of active industry in the Iron manufacturing districts. The Scotch Pig Iron market was in an excited state up till Wednesday. Price of Warrants fluctuated between 118/ to 125/, subsequently closing at 116/. The advance in Glasgow exercised a considerable influence on Middlesborough, causing makers there to become less anxious to do business except at rates which buyers have found it necessary to submit to, and in some cases large transactions have taken place in expectation of prices rising yet higher. Copper has maintained the advance of the two previous weeks, and an active demand still prevails for Chili Bars, English Tough and Manufactured being also in request at prices more favorable to smelters. A further advance has taken place in Spelter. Lead is also slightly dearer and more inquired for. There has not been much doing in Tin, and for the small parcels disposed of prices have been irregular.

IRON—"Ayresome" Yorkshire Pig Iron, No. 1, 107/6; No. 2, 102/6; No. 3, 100/; No. 4, (Foundry), 98/6; No. 4 (Forge), 97/6 net cash, or 2/ extra 4 months' bills. Scotch Pig, warrants, 116/ to 116/6. Staffordshire Bars, £12. 10/ to £14. Hoop Iron, £13. 10/ to £14. Gas Tubes, 47½ per cent. off new list. Boiler Tubes, 17½ per cent. discount.

COPPER.—English Tough Ingot, £91 to £92. Chili Bars, £85 to £87.

TIN.—English Ingot, £128 to £130. Straits, £129 to £130.

TIN PLATES.—Best Coke, I. C., 34/ to 39/; Charcoal, I. C., 40/ to 44/ per box.

LEAD.—Best English Soft Pig, £23 to £23. 10/. Refined Red Lead, £25 to £27.

ANTIMONY.—French Star, £59 to £60

SPELTER.—Silesian Special Brands, £27. 10/ to £29. English, Best Brands, £27. to £27. 10/.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, Sept. 7, 1873.—*Iron*—There is no revival in the French Iron trade. The slight improvement we alluded to has not been sustained. From various quarters we hear complaints of stagnation in the receiving of orders, and the expression of apprehensions as to the future. These fears are twofold in nature—being commercial, and, at the same time, political, and well calculated to depress and check general trade. Coke Iron here, 305 to 310 francs. While this is the case with respect to Iron, other metals are rather better situated. This relates more particularly to *Copper*. During the latter part of August the sales at Liverpool and Swansea have amounted to 3600 tons Bars and 2425 tons Ore. Visible supply at these two places at end of August, 21,900 tons, against 18,800 in 1872, and 20,000 in 1871. *Tin* has fluctuated comparatively little, the different species showing greater animation. Straits, at London especially, have been in increased demand. *Lead* is firm, without leading to much business. The general impression seems to be that it would be difficult to buy large lots without having to submit to higher prices. *Spelter* is decidedly looking up, the movement having been started in England. Germany still lacks animation in the metal. *Coal*—Arrivals from England continue to pour into our ports. The Lille Coal Syndicate is about to order large quantities from the same country, the samples inspected being approved of. Notwithstanding the rise in the Ruhr Country, the railways are bringing us Coal from there in large quantities. The consequence has been that at the North and in Belgium certain concessions are making by the Coal companies, not officially made known, but none the less real.

BELGIUM.

(*Cote Libre.*)

BRUSSELS, Sept. 9, 1873.—*Iron.*—A brighter aspect seems at length to dawn upon iron industry, if we are permitted to base hopes of a permanent amelioration upon the more cheerful accounts we receive from England and the more encouraging signs in our midst. Our Iron masters, whose extreme discouragement we have been at a loss to account for all along, will now look into the future more confidently. *Pig Iron* has been more active in the Belgian markets during the week. Offers to purchase large amounts have been made to several from among our works, but have been declined, being considered too low. The English expect to do a large business with Germany from the moment the new tariff goes into operation removing the duty on Pig Iron, which will be on the 1st proximo. Now, it so chances that Germany consumes a great deal more iron than the country produces, and as the Germans have laid in no stocks while the duty question was pending, that country is, to a considerable extent, bare of available supplies, and we expect to do a large export business in that direction from Belgium, too.

(*Union Financiere.*)

BRUSSELS, Sept. 10, 1873.—*Spelter.*—Not many years ago England's production of Spelter did not exceed a couple of thousand tons annually, a period during which our mines were remarkably profitable investments. Gradually the English Spelter smelting works have been increasing in number, and there are now 17 in active operation, some of them vast establishments, and the gross production of raw Spelter in England in 1872 reached the respectable quantity of 18,000 tons, which forms precisely one-seventh the total annual production of the world during the same year. But for the difficulties which have arisen in connection with the labor and coal questions in England, 25,000 tons instead would have been produced. In order to extract 25,000 tons of pure Spelter England would have require 70,000 tons of ore, and this ore she of course procures partially in countries in which Belgian smelting works compete for it. Should, therefore, at any future time the obstacles above alluded to either disappear altogether in England, or but partially, we may feel assured that we shall have a most formidable competitor, in the way of Spelter production, across the channel.

HOLLAND.

(*Koch & Vlierboom.*)

ROTTERDAM, Sept. 9, 1873.—*Tin*—Although early in the week greater firmness characterized the market, a quieter feeling has since prevailed, and Banca has been done at 78¾ to 79 guilders, and deliverable from the next government sale at 79 to 80. Billiton landing at 77.

GERMANY.

(*Borsenhalle.*)

HAMBURG, Sept. 5, 1873.—Metals are, on the whole, quiet. Lead without anything doing; German, 25 to 26 marks; English, 26·30 to 26·50; no Spanish here. Copper is bought in small quantities for consumption only; Northern sorts, 94 to 105. Tin, neglected; Banca at 1·50 marks; English, 1·40 to 1·45; Rods, 1·42½ to 1·45. Spelter is firmer; sales 1000 cwts., on the spot, 27 marks. *P. S.*, Sept. 8.—*Spelter.*—There have been sold, on Saturday, 500 cwts. Silesian Union at 27⅞, and to-day 1000 cwts. common brands at 27½ marks, all on the spot. Breslau also more active.

(*Borsenblatt.*)

BERLIN, Sept. 4, 1873.—Business in Iron has not lacked a certain degree of animation, but there has been no improvement in values. Of Scotch Pig not inconsiderable parcels have been bought by various Berlin establishments; in other descriptions but a light local trade has been done. Good brands command 75 to 80; English, 64 to 68 silbergroshen the 50 kilos. Rails for rolling purposes, 2 thalers; Rolling Iron, 4½ to 4¾; Boiler Plates, 6½ to 6¾; thin Plates, 7⅛ to 7¼ the 50 kilos, in large lots. Copper, firm; good sorts, 30½ to 31⅛ thalers the 50 kilos, and in some cases higher. Tin is unchanged; Banca, 46 to 46¼, and prime Lamb, 44¼ to 45 the 50 kilos, and even better in some instances. Spelter is quiet; W. H. Giesche's Heirs', in large parcels, 9¼ to 9⅜; inferior brands, ⅛ thaler less. Lead is stiff; Tarnowitz, Hartz and Saxonian, 8¾ to 8⅞, and above this, the 50 kilos.

EAST INDIES.

(*Aitken, Spence & Co.*)

COLOMBO (Ceylon), Aug. 9, 1873.—*Plumbago.*—We are still without any business for American account, but for London there are more orders in the market than can be executed, owing to the scarcity of tonnage. Rates of freight for London for Lead are at present 60/ per ton. The Magdala is expected to sail to-day or to-morrow for New York direct, and has about 430 tons of Plumbago on board. We hear of no further fixtures for the United States. We quote Lump per ton, free on board, with commission, and exchange at par, 526/; Chip, 243/, and Dust, 136/6. Freight to New York, 75/ the 20 cwts. Ceylon Plumbago export to the United States, from October 1 to date, 92,558 cwts., against only 43,798 cwts. in 1872. Export in 1873 to other countries, 56,599 cwts. Exchange in favor of drawers at 4 to 4¼ per cent. premium.

(*Schmidt, Kustermann & Co.*)

PENANG, July 28, 1873.—*The Achinese War*—Our import market has continued very dull, owing to the blockade of all Achinese ports, and the demand for staples is confined to small local requirements. *Tin*—The market opened at $34·10 per picul for unsmelted (£137. 10/ per ton cost and freight for resmelted), but owing to unfavorable advices from London, the rate receded to $33·30 per picul for unsmelted (£134. 6/9 resmelted). Subsequently a good demand for China sprang up, which caused prices to rise again to $34. After departure of last mail, the transactions were restricted to purchases for China and India, at rates gradually declining from $33·40 to $32 60 per picul for unsmelted. The market closes firmer, at $33. Stock in the Bazaar, 500 piculs. *Exchange* has followed the downward movement telegraphed from Singapore and China; we quote the same 4/5⅝, 6 months' London credit. *Freights*—Dead weight is much wanted, but none offering. P. S.—Sept. 4.—*Tin*, $33·30. *Exchange*, 4/3⅛.

The Newark Industrial Exhibition.—The managers of the Newark Exposition have purchased the property known as the old Skating Rink, and have erected an aditional building larger than the Rink. In this undertaking $125,000 have been expended, and on the 29th instant it will be opened with a grand display of Newark manufactures. Further particulars will be found in advertisement on 15th page.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., September 10, 1873.

The prospect of lower prices appears again to be irretrievably lost, and with an almost universal advance in the price of that precious material, coal, there is no possible chance of a reduction this side of Christmas, to say the least. Since I last wrote the warrant market at Glasgow has been characterized by a good deal of wildness, and prices have been most erratic. By flying leaps of 2/, and more, they jumped up in a brief space from 110/ to 112/, to 114/ to 117/6, thence to 122/, and finally to 125/9, at which limit a pause was made, followed since by a recession to 120/, 115/ and to 114/6, which is the current figure as I write. There can, I opine, be little or no question that this violent vacillation has resulted from the bulling and bearing operations of the German speculators, who have for some time past been located on the Clyde, and whose lively skirmishing has seriously deranged the iron market on more than one occasion. These gentlemen, brave Teutons though they may be, might well be spared for the benefit of the Faderland, and doubtless would be were stock, share and warrant gambling made—like betting, which is an analagous pursuit—illegal. Their motives will at once be apparent when I state that there is a great demand for Scotch pig in Germany, which is likely to be largely augmented in October, when the duty is taken off; hence large purchases made now that stocks are excessively low in Scotland, together with a revival of the British iron trade, may in all probability realize 30 or 40 per cent. on the transactions. It will, possibly, be interesting to the trade to learn details of the new German duties. They are: Pig iron—The duty is abolished. Puddled iron is reduced from 12 to 5 silbergroshen per cwt. Wrought iron, in rails, staves, angle iron, T iron, rough iron, parts of machines, carriages, manufactured iron in staves, tires, plow iron, raw, polished and unpolished iron and steel plates, anchors, &c., are reduced from 17½ to 10 silbergroshen per cwt. Common cast metal goods, in plates, furnaces, are reduced from 35 to 12 silbergroshen per cwt. Rough iron and steel goods, sheet iron, wires, axes, hammers, racks, scythes, tubes, are reduced from 40 to 25 silbergroshen per cwt. Soda is reduced one-half, viz., from 15 to 7½ silvergroshen. These reductions are, without doubt, made in order to facilitate the immediate development of the German iron and metal trades, and this it will readily effect by allowing raw materials, unwrought and partly wrought iron and machinery, to come in free, or nearly so. The German mining industries made considerable progress in the decade 1860-1870, being valued at £1,622,544 in the former and £2,977,680 in the latter year, both sums being exclusive of coal. The value of the productions of their foundries, furnaces and works was, in 1860, £11,888,970, and in 1870 £23,413,345, as shown by the Zollverein returns. Some figures, given by a metropolitan journal, showing the iron produced in Germany in 1860 and 1870, comparatively, the number of works and workmen, are interesting. Thus:

Articles.	Quantity Produced in German centals.	No. of Furnaces and Works.	No. of Workmen.
Pig iron, in 1860	9,429,471	329	12,338
Pig iron, in 1870	24,014,757	147	14,718
Raw steel iron, in 1860	144,187	8	143
Raw steel iron, in 1870	2,895,640	14	1,530
Cast iron, in 1860	1,008,076	43	5,751
Cast iron, in 1870	912,674	27	3,149
Cast iron from iron, 1860	1,979,705	218	11,109
Cast iron from iron, 1870	4,708,607	459	21,116
Rod and bar iron, 1860	6,702,223	488	21,208
Rod and bar iron, 1870	14,816,612	278	35,218
Plate or sheet iron, 1860	865,688	25	3,022
Plate or sheet iron, 1870	1,735,377	37	5,345
Steel, in 1860	506,241	167	3,915
Steel, in 1870	3,399,027	216	12,982

This demonstrates an enormous development, in considering which it should not be forgotten that in 1871 we sent to Germany over £1,000,000 worth more iron goods than in 1870, so that in the former year we exported, through the Hause Towns and Holland, and direct, 8,026,607 centals of pig iron, or 90 odd per cent. of the pig iron used in the country. Having thus, in some sort, explained the causes leading to German speculation in Glasgow, I may note that the West Coast and other Scotch brands, have gone up several shillings, and now stand, somewhat irregularly, it is true, at the following prices: Gart-herrie, No. 1, 135/; No. 3, 125/; Coltness, No. 1, 140/; No. 3, 125/; Summerlee, No. 1, 127/6; No. 3, 121/; Carnbroe, No. 1, 128/; No. 3, 123/; Monkland, No. 1, 127/; No. 3, 122/; Clyde, No. 1, 125/; No. 3, 121/; Govan, No. 1, 125/; No. 3, 121/; Langloan, No. 1, 132/6; No. 3, 123/; Calder, No. 1, 130/; No. 3, 122/; Glengarnock, No. 1, 128/6; No. 3, 124/; Eglinton, No. 1, 125/; No. 3, 123/; Dalmellington, No. 1, 125/; No. 3, 123/; Carron, No. 1, 130/; Shotts, No. 1, 127/6; No. 3, 122/; Kinnell, No. 1, 125/; No. 3, 116/.

Shipments still show a decrease of several thousand tons, as compared with the corresponding week of last year, but it is quite probable that this state of things will shortly be reversed. In manufactured iron a rather better business is being done. Turning to the Cleveland district, we find it on record that another slight advance has been made in the price of pig, notably of No. 3, which is currently quoted at 105/, with a rising tendency. The inquiry for rails, now that the Russian season is about closed, has greatly diminished in the district under notice, so much so that the rail mill of Hopkins, Gilkes & Co. is likely to be laid off for want of orders. Quotations are: Rails, £10. 15/ to £11. 5/; plates, £12. 15/ to £13; puddled bars, £7. 15/ to £8; common bars, £11. 10/ to £12; best bars, £12 to £12. 10. The Consett Iron Company (limited), however, appear to have thriven pretty well in these difficult times, if one may judge from the fact that their profit for last year is rather over £300,000. Bolckow, Vaughan & Co. (limited), of Middlesbow, pay 16 per cent., net; John Abbott & Co. 10 per cent., and the Sheepbridge Iron and Coal Company (limited), New Sheffield, cleared £131,000 during the past twelve months. Advices from North Staffordshire chronicle the fact that improved prices are being obtained, crown bars which were a month ago selling at £12 to £12. 10 being now £13; angles at £14, and plates, £16. 10. At Sheffield and in South Yorkshire there is no change of real importance to note, matters being in much the same condition as when alluded to in detail. I hear, however, of certain kinds of iron and steel being advanced in price, and I also understand that a renewed activity is setting in for certain makes of tool, axe, sheet and other steel. Cast steel, shear and blister, are in fair request, Sheffield itself using no mean quantity of each kind. The special tool steel of several firms, to mention whom would be invidious, are in great demand, and, if my information be accurate, a very large proportion is being sent to the United States. The Board of Trade returns show that the falling off for the month is distributed pretty generally over all varieties of iron, with the exception of cast or wrought, in which there is an increase of nearly £64,000 for the month, and of £788,000, or 26 per cent. on the eight months. Russia, Germany, Holland, the United States, and Australia have chiefly contributed to this increase. In pig iron the falling off is due chiefly to Germany and the United States, there being increase in the cases of both Holland and France. In bar iron, the most marked falling off is with the States and Canada, and the principal increases with Germany and Holland. In railroad iron, Russia, Sweden and Norway, Germany, Holland, France, and other countries figure for large increases; but the good effect of these items is more than neutralized by the great falling off with the United States (nearly 60 per cent.) and British North America (nearly 30 per cent.), so that the total decrease in railroad iron is not less than 20 per cent. for the eight months. The totals of value are subjoined:

Iron.	Month of August. 1872.	1873.	Eight months. 1872.	1873.
Pig and puddled	£691,213	£476,641	£4,365,046	£3,090,769
Bar, angle, &c	365,791	292,490	2,401,914	2,256,713
Railroad	1,072,789	985,716	6,417,456	6,599,957
Wire	64,961	56,020	422,002	480,959
Telegraphic do	12,779	336,226	183,792	1,235,873
Cast and wrought	435,341	499,136	2,946,733	2,734,309
Hoops, sheets, &c.	322,859	262,912	2,024,667	2,521,066
Old Iron	14,019	20,079	461,213	808,908
Steel, unwrought	130,751	110,396	951,485	1,009,789

The trade of Birmingham and district is a shade better, and in certain branches great activity is observable, probably owing to the fact that shipping orders for the Baltic are being pushed forward with all possible dispatch. There is no particular amount either with Canada or the United States, but some very good indents are to hand from New Zealand, as also some few from Australia, China, India and Japan for hardware. The rolling mills are busy on brass strips for tubing, and metallic bedsteads are in great request. Gas fittings and bright goods generally are much inquired for. The metal trade of the district is encouraging. The iron market has improved, but business is only on a restricted scale, a state of things brought about by the absence of American orders. Prices remain firm on the basis of £14 for bars, and £15 for sheets. Some brands of finished iron are 5/ per ton higher, and galvanized sheets of corrugate 20 gauge are £24. All mine hot blast pig is £7 to £7. 10/; part mine £6. 10/, and cinder £5 to £5. 10/. At Willenhall the lock trade is busy, and curry combs are improving. At Wednesbury the tube mills are fully employed, and the heavy iron founders at Bilston, West Bromwick and elsewhere are busy. South Wales is yet fairly active on Russian, home, and colonial orders, favors from America being remarkably few and slight. Dowlais last week sent a cargo of rails to

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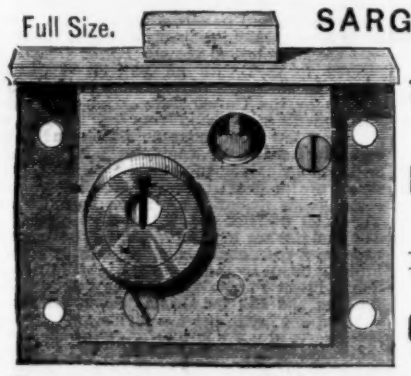

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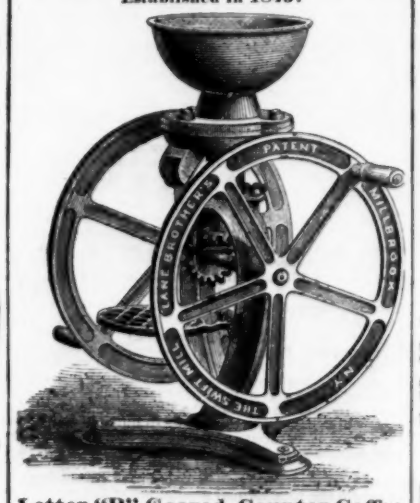

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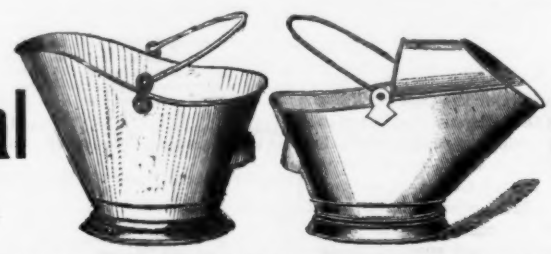
Coal  **Hods.**

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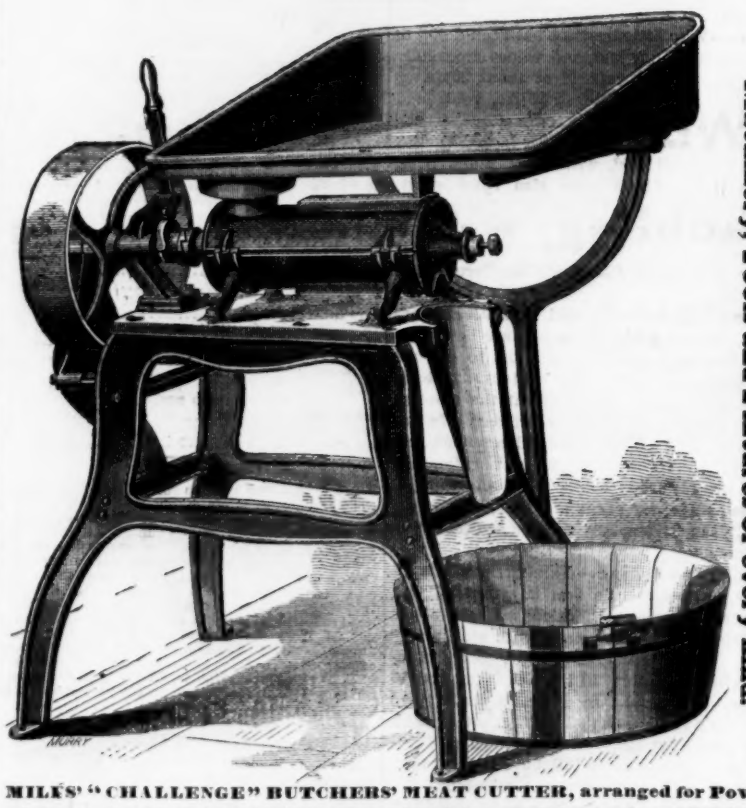

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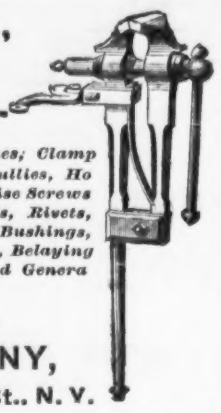

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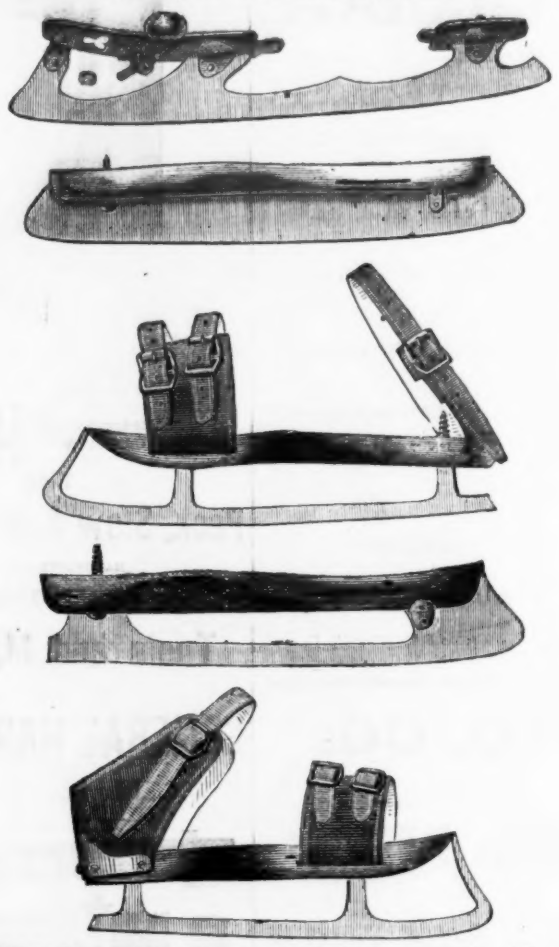

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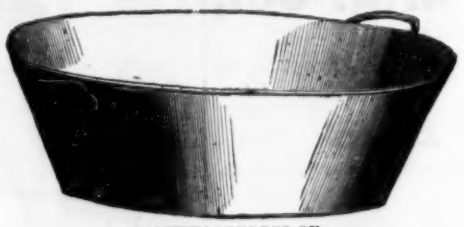

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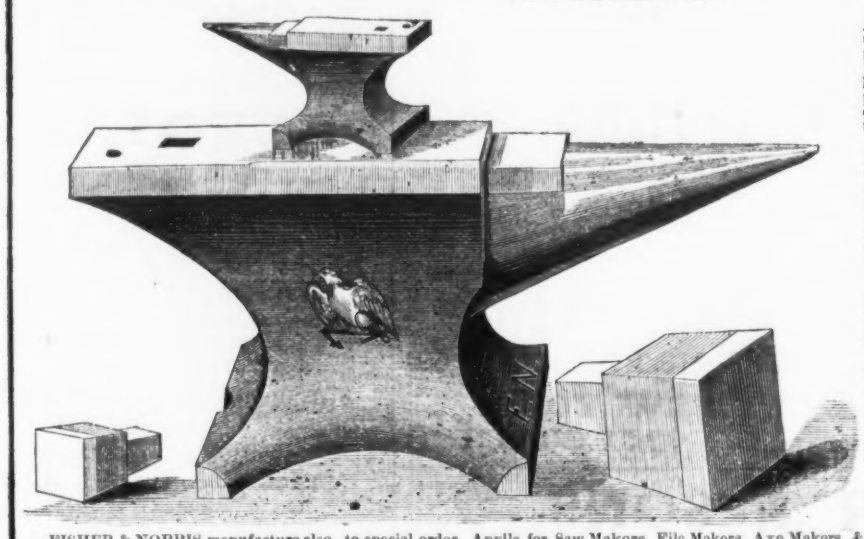

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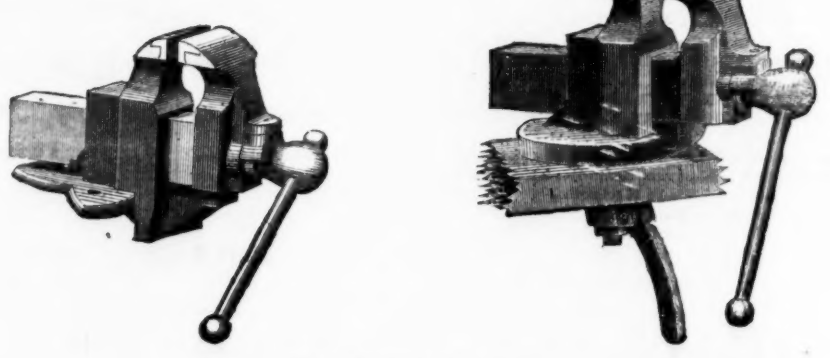

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THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

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Buyers are specially cautioned against IMITATIONS of the MARK, and the SUBSTITUTION of COUNTERFEITS bearing the NAME, "WILSON," only.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

BEAM & MURRAY,

IMPORTERS OF

Anvils, Chains, Pocket Cutlery, Guns, Files,

BIRMINGHAM, SHEFFIELD & GERMAN HARDWARE,

Wostenholm's IXL Pocket Knives & Razors, Butcher's Files, Tools, &c.

No. 54 Cliff Street, NEW YORK.

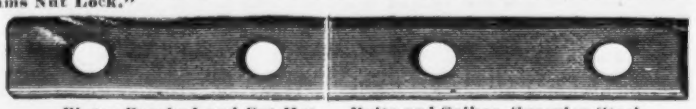
Hardware.

PRATT & CO.,

BUFFALO IRON and NAIL WORKS, Buffalo, N. Y.

Branch Office, 55 Chambers Street, New York.

Manufacture Bar, Angle, and Plate Iron, Spikes and Nails, Railroad Fish Plates, Bolt and Spikes, Railroad and Contractors' Supplies in general, Bolt Blanks, Coach Screws "Adams Nut Lock."



Plates Punched and Cut Hot. Bolts and Spikes, Superior Stock

COLD PUNCHED NUTS.

All sizes constantly on hand. We use the best Lake Superior Iron, and make a uniform handsome nut. Orders solicited. We make washers a specialty. Also

Wholesale Dealers in and Manufacturers of every description of

HEAVY AND SHELF

HARDWARE.

PRATT & CO., Buffalo, N. Y.

GEORGE B. WALBRIDGE,

Manufacturers' Agent,

55 Chambers St., New York, Represents:

National Horse Nail Company, POLISHED AND POINTED NAILS.	Shoenberger's HAMMERED HORSE SHOES.	PRATT & CO., BUFFALO HORSE NAILS, NUTS, WASHERS, Crow Bars, &c.
SHELTON CO., BED SCREWS, CARRIAGE BOLTS, TACKS, &c.	WOOLWORTH HANDLE WORKS, *Axe, Pick and Sledge HANDLES.*	D. H. GOODELL, LIGHTNING AND TURN TABLE APPLE PARERS.
Ten Eyck Mfg. Co., SLEDGES, *GRUB HOES,* HATCHETS, &c.	Woods Cutlery Co., Hot Water Proof TABLE CUTLERY.	ELEPHANT AXES, HATCHETS, EDGE TOOLS.
ALWAYS COOL *STOVE LID LIFTERS,* Ventilated Handles.	H. T. MILLER HATCHETS.	CHALLENGE AUGERS and BITS, *Croton Falls Manuf'g Co.*

YALE LOCK MFG. CO.

Office and Works at STAMFORD, Conn.

Salesroom No. 298 Broadway, New York.

FINE FLAT-KEYED LOCKS for all Purposes.

RIM and MORTISE STORE DOOR LOCKS,

Heavy Front Door and Vestibule Locks.

Rim and Mortise Night Latches,

CLOSET, CHEST, DRAWER, DESK and PADLOCKS,

Post Office Lock Boxes and Prison Locks,

Leeds' Gate Fixtures, Field's Shutter Bars, etc., etc.

The Yale Lock Manufacturing Co.,

STAMFORD, CONN.

The Best TUMBLER LOCK Ever Made.

New Pattern Key. No. 500 Yale Lock.

Samples sent on Application

Ludlow Valve Mfg. Co.,

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,

MAKE

VALVES

(Double and Single Gate, ½ in. to 36 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam.

Send for Circular.

Price: Japanned No. 6, $5; Coppered No. 6, $6; Silvered No. 6, $8.

Liberal discount to the trade. All springs warranted to be of the best Steel Wire.

Depots: HYATT & SPENCER, 54 Beekman St., N. Y. SIDNEY SHEPARD & CO., 68 Main St., Buffalo, N. Y. PALMER & GRAY, 225 Elm St., Cincinnati, Ohio. Factory, Indianapolis, Ind.

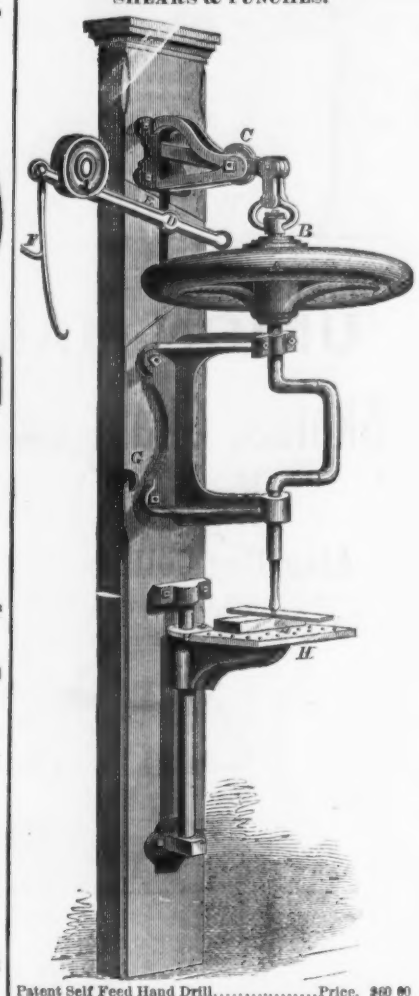
Hardware.

BIDDLE MFG. CO.,

102 Chambers Street, N. Y.,

Fine Tools & Hardware Specialties

IMPROVED DRILL PRESSES, SHEARS & PUNCHES.



Patent Self Feed Hand Drill.....Price, $60 00
Patent Self Feed Power Drill, Single Speed, Counter Shaft and Pulleys complete.....Price, 85 00
Patent Self Feed Power Drill, Three Speeds, Counter Shaft and Pulleys complete.....Price, 150 00

Send for Illustrated Catalogue and Price List.

Sole agents for the Pacific Coast,

Conroy, O'Connor & Co., San Francisco, Cal

THE

Peck, Stow & Wilcox Co.,

MANUFACTURERS OF

TINNERS'

Tools and Machines,

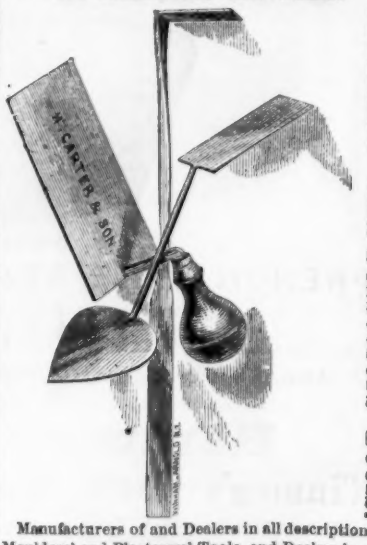
AND

GENERAL HARDWARE

97 Chambers Street, New York.

H. CARTER & SON,

290 PEARL ST., NEW YORK.



Moulders' and Plasterers' Tools.

Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK, &c.

New York Wholesale Prices, September 24, 1873.

HARDWARE.

Anvils.
Solid Cast Steel.....₱ ℔ 14c
Wright's.....₱ ℔ gold 12c ; over 250 ℔s 12½c, gold
Armitage's Mouse Hole.....gold 12c
Wilkinson's.....₱ ℔ gold 11½c
Eagle Anvil Co. ₱ ℔ 12c.....dis 15 @ 15&5 %

Apple Parers.
Turn Table, Lightning, Conqueror.....$8·50 ₱ doz
Reading.....₱ doz $ 00
Union.....₱ doz 9 00
Bay State, Paring, Coring and Slicing.....15 00 | dis
Skeleton " " " .....9 00 | 5 %
Climax Slicer.....9 00
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....dis 25 %
" " No. 1.....dis 25&5 %
" " Hollow Augers.....dis 25 %
Cushman's Expanding Hollow Augers.....dis 20&10 %
Ives'.....dis 25 %
" Hollow Augers.....dis 30 %
" Expansive Augers.....dis 30 %
" " Bits.....dis 25 %
Andrews' Bits.....dis 30 %
Cook's Patent Augers.....dis 30&10 %
" " Bits.....dis 25&10 @ 30&10 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 20 %
Cast Steel Cut Augers.....dis 30&10 %
" Auger Bits.....dis 30&10 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " " .....$48 per doz—dis 30 %
Morse's Bit Stock Drills.....dis 20 %

Axes.
Blood's.....$12 50 @ 14 00
Hunt's.....₱ doz $15 00 @ 17 50 net @ dis 5 %
Collins'.....₱ doz 12 00 @ 16 00 net @ dis 5 %
Hurd's.....₱ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₱ doz 13 00 @ 15 00
Simmons'.....₱ doz 12 00 @ 13 50
Morris'.....₱ doz 12 50 @ 13 50
Red Jacket.....₱ doz 12 00 @ 12 50
Mann's.....₱ doz 12 50 @ 13 00
" Double Bitted.....₱ doz 21 50 @ 22 00
Powell Tool Co., "Peerless".....₱ doz 13 00 @ 14 50
Underhill's.....₱ doz 12 50 @ 13 50
" Crown.....₱ doz 13 00 @ 14 00
John Leverett's.....₱ doz 12 50 @ 15 50

Balances.
Chatillon's, Frary's, Morton's.....new list dis 15 %

Bands.
Plated.....add 10 ; dis 5 %
Iron.....dis 15&5 %
Brass (Plated list).....dis 5 %
Oroide.....add 15 ; dis 5 %

Bells.
Hand, Light Brass.....dis 60&10 %
White Metal.....dis 45&10 %
Globe.....dis 20 %
Swiss Hand.....dis 10 %
Abbe's.....dis 10&10 %
Taylor's Patent Door.....net
Western Gong.....net
Brook's Crank.....net list
" Pull.....dis 15 %
Hart Mfg. Co., Crank and Pull.....new list dis 50 %
Cow—Common Wrought.....new list dis 33⅓ %
Western.....new list dis 33⅓ %
Kentucky "Star".....new list dis 20 %
Dodge's Genuine Kentucky.....new list dis 25 %
Yaw's Genuine.....dis 20 %

Bellows.
Blacksmiths'.....dis 10 %
Moulders'.....dis 15 %

Blind Fasteners.
Van Sand's.....₱ gross $14 00
Washburn's Patent.....₱ gross 14 00
Merriman's.....add 35 @ 40 %

Blind Staples.
Boardman's Patent, ½ in. and larger.....₱ ℔ 37½c
" ⅜ in " " 42 c

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel, Shutter, &c.....old list dis 50&10 %
Wrought Iron Barrel.....net
" " Square.....dis 10&10 %
Carriage and Tire, Common.....dis 50&10 %
" " Norway Iron.....dis 40 %
Star, Philadelphia.....dis 40 %
Eagle, Philadelphia.....dis 40 %
Philadelphia Pattern, P. S. & W.....dis 50&10 %
Carriage and Tire, R. B. & W.....old list dis 50&5 %
Plow, R. B. & W.....dis 30 %
Stove, R. B. & W.....dis 10 %
Union Nut Co.....dis 50&10 %
Machine.....dis 25 @ 30 %

Borax.—Per case of 100 lbs.....₱ ℔ 22c

Boring Machines.
Kellogg's.....dis 10 @ 15 %
Snell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglas Mfg. Co.....dis 20 %
Hovey's Angle.....$6 00 @ 6 25
" Upright.....4 25 @ 4 50
Mortising Machines each.....$18 00

Bow Pins......dis 45 @ 50 %

Braces.
Barber's Patent.....dis 40 %
Wilson Mfg. Co.....net @ add 5 %
Spofford's Patent.....dis 40 %
Noble's Patent.....dis 33⅓ %
Bartholomew's American Ball.....dis 10&10 %
" Patent Grip.....dis 40 %
Q. S. Backus & Co.....dis 30&10 %

Bung Hole Borers.
Common and Ring.....dis 20 %
Enterprise Mfg. Co.....dis 20 %
Ives' Tap Borers.....dis 20 %

Butchers' Cleavers.
Bradley's.....dis 15 %
Beatty's.....new list dis 10 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$21·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$25·25	$29·75	$30·25	$38·75	$43·55	$43·50	$54·00

Butts.
Wrought Brass.....new list dis 20 %
Cast Fast Joint, Narrow.....dis 40 %
" " Broad.....dis 40 %
Cast Loose Joint.....dis 50 %
" " Mayer.....dis 40 %
" " Parliament.....dis 40 %
Loose Pin.....dis 40&10 %
Wrought Fast Joint, Narrow.....dis 30&5 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 25&5 %
Cast Butts, Ohio Butt Co.—
Narrow Fast, Drilled and Wire Jointed (old list).....dis 35 %
Broad Fast, Drilled and Wire Jainted.....dis 35 %
Broad, Loose, Drilled and Wire Jointed.....dis 45 %
Silver Tipped.....dis 15 %
Loose Joint, Japanned.....dis 25 %
Loose Joint, Acorn and Silver Tipped.....dis 40 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 40&10 %
A. S. Parker's.....dis 40&10 %
Clark's Blind Butts.....dis 40&10 %
Clark's Blind Hinges, No. 20.....dis 50&5 %
Seymour's.....dis 40&10 %
Shepard's.....dis 40&10 %
Garretson's.....dis 40&10 %
Standard.....dis 40&10 %
Union Mfg. Co.—
Drilled and Wired Cast Fast.....dis 35 %
" " " Loose.....dis 45 %
Loose Joint Japanned or Silvered Acorn.....dis 40 %
" " Figured Enameled.....dis 25 %
" " Nickel Capped.....dis 30 %
" " Solid Bronze.....dis 10 %

Caps—Percussion, per 1000.
G. D.....40c
Ely's E. E.....1-4s, 60c. ; 1-10s, 67½c., gold
" Double Waterproof, 1-4s, $1·50 ; 1-10s, $1·57½c., gold
Colt's.....1-4s, 72½c ; 1-10s, 82½c., gold

Cartridges.
Metallic.....dis 50 %

Cards.
Horse and Curry.....dis 25&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Casters.
Iron and Wood Wheel Plate.....new list dis 20&10 %
Brass Wheel Plate.....new list dis 30&10 %
Porcelain Wheel Plate.....new list dis 20&10 %

Chain
English Coil.....net gold

₱ ℔	13/4	10	9¾	8¾c	8¼c	8¼c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6¾-10-2.....₱ pair, gold, 62c
Trace, 7-10-2.....₱ pair, gold, 67c
Galvanized Pump Chain.....₱ ℔ 14c
German Halter Chain.....new list, gold, dis 25 %
German Coil.....new list, gold, dis 25 %
Jack Chain, Iron.....dis 35 @ 40 %
" Brass.....dis 30 @ 25 %

Chalk.
White.....₱ gross, 60c
Red.....₱ gross, 80c
Blue.....₱ gross, 90c
Crayons.....₱ gross, 14c

Cherry Stoners.
"Family".....₱ doz $9·00

Chisels.
Socket Firmers.....dis 60&5 @ 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10
Tanged Firmers.....dis 40 to 40&10 %
Butcher's.....$5·50 to £ gold—new list
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold—new list

Clips, Axle.
Norway or Best.....dis 20 @ 30 %
Superior.....dis 40&5 %
"Star," Superior, Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₱ doz, $ 85 @ 1 25
Wooden Handled.....₱ doz, 1 00 @ 2 00

Coal Hods.
Smith, Burns & Co.....dis 25 %

No.	14	15	16	17	18	
Japanned	$9·00	9·75	10·50	12·00	13·50	per doz
Galvanized	13·00	14·50	15·50	17·50	19·50	"

Cocks.
Brass Racking.....dis 20&10 %
Lock and Globe.....dis 30&10 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 10 %
Selsor's Pat.....$9·50, $10·50—dis 20 %
French Steel.....dis 10 @ 20 %
"Champion".....dis 20 %
Swift's.....dis 20 %

Compasses and Dividers.
Bemis.....dis 15&15 @ 20&5&15 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's.....list net

Crucibles.
Gautier & Co.....₱ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 15 %
Fitch's.....dis 15&10 %
Ruggles'.....dis 15 @ 20 %
Rubber.....₱ doz, $9·00—dis 10 %
Schweitzer Mfg. Co.....dis 20 %

Curtain Pins.
Silvered Glass.....dis 40&10 %

Cutlery.
American Table.....
American Pocket.....dis 15 %

Door Springs.
Gray's.....$7·50 per doz—dis 40&10 %
Torrey's Patent.....$7·50 ₱ doz—dis 40 @ 40&10 %
Palmer's Japanned No. 6.....₱ doz $5·00
" Coppered " .....6·00
" Silvered " .....8·00
Challenge,—
Japanned.....₱ doz $4 00 @ 6 00
Bronzed.....₱ doz 5 00 @ 7 00
Nickel Plated.....₱ doz 6 50 @ 9 00
1 Gross lots.....dis 10 %
5 Gross lots.....dis 20 %

Drawing Knives.
.....dis 60 @ 60&10 %
Bradley's.....dis 25 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %

Egg Beaters.
Monroe's.....₱ doz net $8·25 @ 8·50
Ashley's.....₱ doz net 2·25 @ 3·00
Earle's Patent.....₱ doz net 5·50 @ 6·00
Pratt's Aerating.....dis 10 %
Dover.....₱ doz net $6·00

Emery.
Genuine Chester—Regular Nos.....₱ ℔ 8c | dis 5 @ 10 %
" Flour and FF.....₱ ℔ 5c |
Washington Mills—Regular Nos.....₱ ℔ 8c
" Flour.....₱ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 15 %
Sauce Pans, Glue Pots, &c.....dis 10 %

Faucets.
Cork Lined, Wood.....dis 60 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 10&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Files.
Nicholson.....$5 00 to £ currency
Newbould's.....5 50 to £ gold
J. & Riley Carr's.....5 50 to £ gold
" " Rasps.....5 75 to £ gold
Stubs'.....8 50 to £ gold
Butcher's.....5 50 to £ gold
Spear & Jackson's.....5 50 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold

Fluting Machines.
Acme.....$7 00 each net
Cole.....5 75 each net
Manville, No. 2.....7 00 each net
Knox, with 4-inch Rolls.....5 00 each net
" " 6 " .....6 00 each net
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....5 00 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4-inch Roll.....5 50 each net
" 6-inch Roll.....6 00 each net
Fairy, Self-Heater.....10 00 each net
National, 5-inch Rolls.....5 00 each net
Ponton Fluter, Bright.....$1 50—dis 25 %
" " Galvanized.....2 00—dis 25 %
Geneva Hand Fluter.....$1 25 each net

Fry Pans.
Tinned.....dis 20 %

₱ doz.	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Peck, Stow & Wilcox.....dis 25 %
Smith, Burns & Co., "Excelsior" Polished.....dis 20 %

₱ doz	$3·70	4·00	4·70	5·30	6·00	7·00	8·00	9·00
No.	1	2	3		5	6	7	8

Hammers.
Emmet Hammer Co.....dis 10 %
Maydole's.....new list net
Cheney's.....new list net
Verree ℔.....dis 5 %
Yerks & Plumb.....new advanced list dis 5 @ 10 %
Minot & Co.....dis 15 %

Handles.
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %

Harness Snaps.
Judd's.....dis 30 %
Fitch's.....dis 30 %

Hatchets.
Isaiah Blood.....dis 10 %
Shingling, Nos. 1 2 3.....₱ doz $7 50 8 00 8 50
Claw, " 1 2 3.....₱ doz 8 50 9 00 9 50
Lathing, " 1 2 3.....₱ doz 7 50 8 00 8 50
Hunt's.....net
Shingling, Nos. 1 2 3.....₱ doz $7 25 8 00 8 75
Claw, " 1 2 3.....₱ doz 7 75 8 50 9 25
Lathing, " 1 2 3.....₱ doz 7 50 8 25 9 00
Hurd's.....dis 20 %
Shingling, Nos. 1 2 3.....₱ doz $8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s.....dis 25 %
Shingling, Nos. 1 2 3.....₱ doz $6 50 7 00 7 50
Claw, " 1 2 3.....₱ doz 7 25 7 75 8 25
Lathing, " 1 2 3.....₱ doz 6 50 7 00 7 50
Yerks & Plumb.....dis 10 %
Shingling, Nos. 1 2 3.....₱ doz $7 00 7 50 8 00
Claw, " 1 2 3.....₱ doz 7 50 8 00 8 50
Lathing, " 1 2 3.....₱ doz 7 00 7 50 8 00
Simmons's.....dis 10 @ 15 %
Shingling, Nos. 0 1 2 3.....₱ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
Broad, " 1 2 3.....₱ doz 9 00 10 00 12 00
" " 4 5 6.....₱ doz 14 00 16 00 18 00
" " 7 8.....₱ doz 20 00 22 00
Elephant.....dis 20 %
Shingling, Nos. 1 2 3.....₱ doz $8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
J. P. Verree & Co.....dis 5 %
Shingling, Nos. 1 2 3.....₱ doz $7 00 7 50 8 00
Claw, " 1 2 3.....₱ doz 7 50 8 00 8 50
Lathing, " 1 2 3.....₱ doz 7 00 7 50 8 00
Underhill's.....dis 10 %
Shingling, Nos. 1 2 3.....₱ doz 7 25 8 00 8 75
Claw, " 1 2 3.....₱ doz 7 75 8 50 9 25
Lathing, " 1 2 .....₱ doz 11 00 12 00

Hinges.
Wrought Strap and T.....dis 30&7½ %
Providence Plate.....{ 6 and 8 in. list 11c. / over 8 in. list 9½c. } dis 10&5 %
Screw Hook and Strap.....{ 8, 10, 12 in. 8¾c / 14 to 36 in. 7¼c } net

Hoes.
Solid Shank, C. S.....₱ doz $8 00—dis 20 @ 25 %
Socket.....₱ doz 9 00—dis 20 @ 25 %
Riveted Eye.....₱ doz 5 00—dis 20 @ 25 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 83⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Belt.....dis 50 %
Bench.....₱ doz net $3 00 @ 3 50
Wardrobe, Japanned.....new list dis 10&10 %
Hat and Coat " .....new list dis 15&10 %
Wrought Staples and Hooks and Staples.....dis 60 %
Wrought Hasps and Staples and Hasps, Hooks and Wrought Staples.....dis 60 %
Screw Hooks and Eyes, revised list.....dis 65&10 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable.

No.	5	6	7	8	9	10
	30c	28c	26c	24c	23c	22c

In lots of 1000 lbs. 5 % disc. net.

Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22e	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	22c	20c	20c	20c	20c	20c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	32c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₱ ℔ 16c
Morgan.....16c

Horse Shoes.
Burden.....₱ keg, $6 37½
Shoenberger.....₱ keg, 6 37½
R. I. Horse Shoe Co., Perkins Pattern.....₱ keg, 6 87½
" " R. I. Pattern.....₱ keg, 6 87½
Mule Shoes.....₱ keg, 7 37½

Kettles.
Enameled.....dis 15 %
Brass.....₱ ℔ 55c
In lots of 500 ℔s.....₱ ℔ net 50c

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 15 %
Hay and Straw, "Wadsworth's".....dis 20 %

Knobs.
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %
Trenton Lock Co.....dis 40 %

Lanterns.
Brady's Patent.....dis 10 %
Ætna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Trenton Lock Co.....dis 40 %
Branford.....dis 40 %
Norwich.....dis 40 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₱ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₱ doz	$27 00	$33 00	$42 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	400	300	200
₱ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₱ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

No.	1	2	2½	3	4	5
Each	$6 00	$9 00	$14 00	$15 00	$30 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 %
Tinned ends.....dis 40&10 %
Weed's Patent Self-Boring.....dis 15 %
" without Auger Bit.....dis 40 @ 50 %
Patent Self-Measuring.....per doz $42 00—dis 20 %

Mouse Traps.
Wood Choker.....₱ doz holes, 16 @ 20c

Nails.
10d Cut (Standard).....$4 75

Nuts and Washers.
Nuts.....large, 4c ; small, 5c off list.
Washers.....large, 5c ; small, 7c off list.

Oil Stones.
Washita No. 1.....₱ ℔ 22c
" Slips.....₱ ℔ 44c
Hindostan.....₱ ℔ 6c dis 10 %
" Slips.....₱ ℔ 10c dis 10 %

Oilers.
Olmsted's.....dis 25&10 %
Broughton's.....dis 25&5 %
Common Zinc, Brass and Copper.....dis 25 %

Picks.
Washoe R. R. Nos.

₱ doz...	1	2	3	4	5
	$14·00	15·00	16·00	17·00	18·00
Washoe Coal, "	$8·50	9·00	10·00	11·00	13·00	15·00

Picture Nails and Knobs.
Richards' Patent.....dis 40 @ 40&10 %

Planes.—(See Trade Report.)
Plane Irons.
" Butcher's.....$5 50 to £ gold—new list
" Spear & Jackson's.. 5 50 to £ gold—new list
" Sandusky Tool Co.....list net

Plumbs and Levels
Standard Rule Co.'s New Adjustable.....dis 50&10 %

Pumps.
Douglas Cistern, etc.....new list dis 25 %
" S. & F.....new list dis 20 %

Rakes.
Cast Steel.....dis 25 %

$8 00	9 00	10 00	11 00
8	10	12	14 teeth.

Razor Straps.
Genuine Emerson (B. F. Badger).....dis 40&10 %
Hunt's.....dis 25&10 %
Chapman.....dis 10 @ 15 %

Rivets.
Iron and Tinned.....dis 25 %
Copper Rivets and Burrs.....dis 10 %

Rods.
Stair.....new list dis 25 %
American Patent.....dis 25 %

Rope. Manufacturers' List
Manilla.....½ inch and larger ₱ ℔ 17½c
" .....⅜ inch ₱ ℔ 18c
" .....⅜ and 5-16 inch ₱ ℔ 18½c
" Lath Yarn.....₱ ℔ 18c
" Hay Rope.....₱ ℔ 18c
Sisal.....½ inch and larger ₱ ℔ 15½c
" .....⅜ inch ₱ ℔ 16c
" .....⅜ and 5-16 inch ₱ ℔ 16½c
" Hay Rope.....₱ ℔ 16c

Rules.
Hubbard & Curtiss Mfg. Co.....new list net
Stanley Rule and Level Co.'s Ivory.....dis 50&10 %
" " " Boxwood.....dis 60&10 %
Standard Rule Co.'s Boxwood.....dis 60&10 %
" " " Ivory.....dis 50&10 %

Sad Irons.
.....₱ ℔ 4¾c net

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½.....$4 50 ₱ ream
" " " 2, 2½ & 3.....5 00 "
Assorted.....4 50 "
Star.....₱ ream $3 50
Emery.....₱ ream $7 00 @ 12 00
Cowdin Mfg. Co.....dis 7½ @ 10 %
Diamond Flint, 00 to 1½.....per ream $4 50
" " 2, 2½, 3 and assorted.....5 00
" Emery Paper.....per ream $7 00 to 12 00

Sash Locks.
Clark's.....dis 20 %
Ferguson's.....dis 20 @ 25 %
Champion.....₱ gross $13 00 @ $15 00
Norwich.....dis 15 %

Sash Weights.
Solid Eyes.....₱ ℔ 2¾c

Sausage Fillers.
Perry's (P. S. & W.).....dis 10 %

No.	1	0
₱ doz.	$15 00	$21 00

Saw Rods.
.....dis 10 %

Saws.
Spear & Jackson's.....$4 50 to £ gold
John Spear.....$3 60 to £ gold
Am. Saw Co.....new list
Perforated Cross Cuts, all kinds.....68c ₱ foot
Inserted Tooth.....dis 10 %
All else.....dis 12½ %
Disston's.....dis 12½ %
H. W. Peace's Circulars.....dis 10 %
Other kinds.....dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular.....new list dis 10 %
E. M. Boynton's Lightning.....dis 30 %
" " Others.....dis 10 %

Scales.
Brown's.....dis 25&5 %
Fairbanks'.....new list dis 15 @ 20 %
Howe's.....dis 15&5 %
Shattuck's Counter and Union.....dis 15 %
National Platform.....dis 25 %
Eureka.....dis 25 %
Scale Beams.....dis 20 %
No. 1 300 to 1200 lbs.....90c ₱ cwt
No. 2 " " .....75c ₱ cwt

Screws.
American list of April 1, 1873.
Flat Head Iron.....dis 47½ %
Round Head Iron.....dis 45 %
Flat Head Brass.....dis 60 %
Round Head Brass.....dis 30 %
Round Head Silver Capped.....new list dis 20 %
Hand Rail.....dis 20 %
Coach or Lag.....dis 25 %
Coach, Patent Gimlet Point.....dis 15 %
Bed.....list net

Scythes.
Blood's German Steel, Grass.....₱ doz $9 00
" " Cast " .....₱ doz 10 00
" " Silver " .....₱ doz 11 00
" " German " Grain.....₱ doz 13 00
" " Cast " .....₱ doz 14 00
" " Red Rover.....12 00
" " Young America.....9 50
" " Silver Clipper.....12 00
Scythe Snaths.....dis 20 %

Shears.
Cast Steel.....dis 60&10 %
Conn. Cutlery Co., new brand.....dis 60 %
Rowe's.....dis 50&10 %

Shovels and Spades.
Ames.....list July 1, '70, list net @ dis 2½ %
Rowland.....new list Feb. 8, '73, dis 20 %
Old Colony.....dis 2½ %

Shovels and Tongs.
Iron Head.....list net
Brass Head.....dis 5 %
Polished Steel.....new list dis 15 %

Slates.
Square Frames, Round Cornered, by case.....dis 60&10 %
Less than a case.....dis 50 @ 55 %
Oval Frames, by case.....dis 40 @ 40&10 %
Less than a case.....dis 30 %

Spoons.
Iron.....new advanced list, dis 10 %
By the case.....dis 20 %
Britannia.....revised list dis 30&5 %
Plated A 1.....revised list dis 30&5 %
German Silver.....revised list dis 15&5 %
Tinned (P. S. & W.)—
Teas.....$1·50 ₱ gross, net
Tables.....2·75 " net

Stocks and Dies.
.....dis 15 %

Stove Polish.
Joseph Dixon's.....₱ gross, $6 00 @ 6 25
National.....₱ gross $4 75
Gold Medal.....₱ gross $6 00, dis 15 %
Gem.....₱ gross $5 00, dis 10 %

Squares.
Steel.....dis 50 % ; full cases, dis 50&10 %
Iron.....dis 50 % ; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₱ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 50 %

Tacks.
Full Weight American Iron.....dis 35&7½ %
Half Weight American Iron.....dis 67½&7½ %
Carpet.....dis 7½ %
Brads American Half Weight.....dis 50&7½ %
Finishing Nails.....½ ⅝ ¾ 1 1¼ in. and over
₱ ℔.....25c 20c 18c 14c 13c dis 7½ %
Trunk and Clout.....½ ⅝ ¾ 1 1¼ in. and over
₱ ℔.....25c 20c 18c 14c ⅜ dis 7½ %
Copper Tacks.....₱ ℔ 56c—dis 7½ %
Iron Shoe Nails, ₱ ℔ 4-8 and longer, 10½c ; 3½-8, 11c.....dis 7½ %
Double Pointed.....new list dis 33⅓ %

Tapes, Measuring.
American Flask and Cap Co.....dis 10&10 %
Eddy's.....dis 10&10 %

Toe Calks.
.....₱ ℔ 13c net

Tobacco Cutters.
Champion.....dis 20 %
Peck, Stow & Wilcox.....dis 10 %

Tinners' Tools and Machines.
P. S. & W.....list net

Traps.
Newhouse.....dis 20 %
Hotchkiss.....dis 20 %
Peck, Stow & Wilcox.....dis 30 %
Blake's Patent.....dis 15 @ 20 %

Vises.
Trenton Vises, Solid Box.
30 to 110 lbs.....17c
111 to 160 lbs.....18c
160 and over.....21½c
Peter Wright's.....₱ ℔ 15½c, gold
Wilson's Solid Box.....dis 10 @ 15 %
39 to 160 lbs.....18c
160 and upward.....21c
Backus & Union, Parallel.....dis 25 %
Buffalo, Parallel.....new list dis 15 %
Fisher & Norris' Double Screw Parallel.....dis 15 @ 15&5 %

Wire.
Bright and Annealed.....No. 0 @ 18 dis 30 @ 32½ %
" " " .....19 @ 26 dis 40 @ 42½ %
" " " .....27 @ 36 dis 45 @ 47½ %
Coppered.....Nos. 0 @ 18 dis 20 @ 25 %
Galvanized, Nos. 0 to 12.....dis 35 @ 40 %
Galvanized, Nos. 13 to 18.....dis 40 @ 45
Tinned.....dis 15 @ 20 %
Cast Steel.....5 @ 10 %
Tinned Broom Wire.....dis 20 @ 25 %
Galvanized Telegraph, Nos. 8 and 9.....₱ ℔ 10c @ 11c
" " " 10 and 11.....₱ ℔ 11c @ 12c
" " " 12.....₱ ℔ 11½c @ 12½c
Annealed Fence, Nos. 8 and 9.....dis 30 @ 32½ %
" Grape, " 10 to 14.....dis 30 @ 32½ %
Fence Staples.....₱ ℔ 9¼ @ 10c
Stubs' Steel Wire.....$7 00 to ₱ gold

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 20 %
" Diagonal.....dis 20 %
Collins & Co.'s.....new dis list 30 %
Coes Genuine.....dis 40 %
" Pattern (Wrought).....dis 50 %
" (Malleable).....dis 50&10 %
Lindsay's Patent.....dis 25 %
Taft's Patent Screw.....dis 65&10 %
Davis' Patent Duplex.....new list dis 25 %

METALS.

IRON.—DUTY: Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 75 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1.....₱ ton, $42 00 @ 44 00
Foundry No. 2....." 34 00 @ 35 00
Gray Forge....." 30 00 @ 32 00
White and Mottled....."
SCOTCH.
Gartsherrie....." @ 50 00
Coltness....." 51 00 @ 51 50
Glengarnock....." 47 00 @
Eglinton....." 46 00 @

Bar Iron.
Am. rolled, at mill.....₱ ℔ 3·7 @

Rails.
Welsh, gold.....₱ ton, 65 00 @
American, at works, currency....." 75 00 @
Old Rails, currency....." 46 00 @ 47 00

Scrap.
Wrought Scrap, from yard, nominally....." 46 00 @ 47 00

Bar Iron from Store.

Common Iron.			
⅜ to 2 in. round and square	₱ ton,	$ 77 50	
⅜x9-16 in "	"	82 50	
⅝ in. "	"	85 00	
2½ to 3 in. "	"	82 50

Chrome Steel.

Tool	₱ lb 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₱ lb 12c and upward
Machinery	₱ lb 14c.
Hammer	" 15c,
Gun or Homogeneous	" 16c.
English Steel,—payable in gold, dis 5 % cash.	
" Best Cast	₱ lb 19½c
" Extra Cast	" 20½c
" Round Machinery, Cast	" 12½c
" Swaged, Cast	" 21½c
" Best Double Shear	" 19½c
" Blister, 1st quality	" 15½c
" " 2d quality	" 18½c
" " 3d quality	" 11½c
German Steel, Best	" 12½c
do Eagle	" 11½c
do 2d quality	" 10½c
Sheet Cast Steel, 1st quality	" 19½c
" " 2d quality	" 17½c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	7¼ @ 7¾c., gold
American "	8 @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per ₱; Manufactures of, not enumerated, 35 per cent. ad val. —all subject to a reduction of 10 per cent. Bars, Bancs or Block, and Pigs, free.

Bancs	₱ lb 25c., gold
Straits	₱ lb 32c., gold
English	₱ lb 29½ @ 30c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	13·00
12x12, "	13·50
14x20, "	14·00
I X 10x14, "	15·25
12x12, "	15·75
14x20, "	16·25
For each additional X add	2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary
I C 10x14	$12·50	$11·50	9·50 @ $10·50
I C 12x12	13·00	12·00	
I C 14x20	13·25	12·25	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$12·00	11·25 @ 11·50	9·25 @ 11·25
I X 14x20	14·00		

ZINC—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2½c. ₱ lb. All subject to a reduction of 10 per cent.

Sheet	cask 10½c
"	open 11c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6 @ 6¼
" cotton, No. 1	7 @ 7¼
" " No. 2	4
White linen rags, No. 1	7 @ 7¾
" " No. 2	4¾ @ 5
Colored	3 @ 3¼
Mixed woolens	2 @ 3
Soft woolens	7 @ 7½
Gunny bagging	1¼ @ 1¾
Jute Butts	1½ @ 2
Kentucky bagging	3½ @ 3¾
Book stock	4½ @ 4¾
Waste paper and scraps	2½ @ 3
Rope cuttings	1½ @ 2
Kentucky Bale rope	4 @ 4¼
Oakum junk, No. 1	5½ @ 5½
" No. 2	4½ @ 4¾
Grass rope	4¾ @ 4½
Tarred Shaking	1¾ @ 2

Old Metal.

Copper	26 @ 27
Yellow metal	18 @
Brass	18 @ 20
Heavy Composition	21 @ 23
Old lead, solid	6½ @ 7
Tea lead	6
Wrought iron	1¾ @ 2
Sheet iron	1 @
Cast iron	1 @ 1¼
Machinery iron	1¾ @ 2
Zinc	6
Pewter, No. 1	26 @ 27
" No. 2	10 @ 12
Spelter	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₱ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	25c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75c
" " in oil	35 @ 45c
" Chinese, dry	53c
" Ultamarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	3c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	" 30c; " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Red Lead, American	9¼c
" " English	10½c
" Venetian (N. C.) dry	2¾c
" " in oil	asst'd cans, 11c; kegs, 8¾c
" Indian, dry	10c
Rose Pink	18c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	$1 45
" English	1 40
" Trieste	1 15
" American, Common	25c
White Lead, American, pure dry	11½c
" " " in oil	12 c
White, Paris, English, prime	in bbls. 2½ @ 2¾c
Yellow Ochre French	2½ @ 2¾c
" " in oil	asst'd cans, 11c; kegs, 8 c
" Vermont	In casks 1½c
" Chrome	17 @ 21c
" " in oil	18 @ 22c
Zinc White, American No. 1 dry	9c
" " 1, in oil	11c
" French (Paris)	1 c
" " in oil	1 c

Oils.

Linseed Raw	₱ gal. casks, 98c; bbls, 99c
" Boiled	" $1·02 " $1·04
Whale, Crude	"
" Bleached Winter	"
Sperm, Crude	"
" Winter unbleached	"
" " Bleached	" 1 80
Seal, Extra Refined	" 87½c
Lard, Pure Winter	" 80c
" Spring	76c
Cotton Seed, Crude	" 55c
" Southern Yellow	" 65c
" White	" 75c
Neatsfoot, Winter	$1·10 @ $1·35
Natural Lubricating	bbls, 45c

Sundries.

Asphaltum	9c
Benzine	₱ gal. 16c
Chalk	1½c
" Block	
Dryer, Patent, Am'n	ass't cans, 10 c.; kegs, 9c
" " English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 45c
" Sheet	38c
Glaziers' Points, Zinc	9c
Gum, Copal	26c
" Damar	25c
" Shellac, English	60c
" " dark	46c
Litharge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	4
Whiting, Spanish	1¼c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·75	$6·00
8 x 10 to 10 x 14	8·50	8·00	7·25	6·50
10 x 15 to 12 x 16	9·00	8·50	8·00	6·75
13 x 16 to 16 x 20	9·50	9·00	8·50	7·75
15 x 22 to 15 x 30	11·75	10·50	10·00	8·00
16 x 30 to 22 x 30	14·25	12·25	11·00	9·50
15 x 38 to 22 x 36	15·00	13·50	12·00	
24 x 36 to 24 x 40	15·75	14·25	12·50	
28 x 38 to 28 x 42	16·25	14·75	13·25	
28 x 44 to 28 x 50	17·25	15·75	14·25	
30 x 50 to 30 x 54	20·50	17·00	15·50	
32 x 54 to 34 x 56	21·50	19·25	17·50	
34 x 58 to 34 x 60	23·00	21·50	20·25	
36 x 60 to 40 x 60	26·50	24·25	23·00	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$13·00	$12·00	$11·50	$10·00
8 x 10 to 10 x 14	14·00	12·75	12·00	10·75
10 x 15 to 12 x 16	15·00	14·00	13·25	11·25
13 x 16 to 16 x 20	16·00	15·00	14·50	12·50
15 x 22 to 15 x 30	20·00	17·50	16·50	13·25
16 x 30 to 22 x 30	22·00	19·25	17·75	15·00
15 x 38 to 22 x 36	25·75	20·50	19·25	
24 x 36 to 24 x 40	27·75	22·50	20·00	
28 x 38 to 28 x 42	26·00	24·50	21·50	
28 x 44 to 28 x 50	27·50	25·50	23·40	
30 x 50 to 30 x 54	31·00	26·50	24·00	
32 x 54 to 34 x 56	32·50	29·00	26·50	
34 x 58 to 34 x 60	34·50	33·00	31·00	
36 x 60 to 40 x 60	39·50	36·50	33·00	

Sizes above—$12·00 per box extra for every 5 inches. Discount to the trade 40@40& 10 per cent.

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

HORACE DURRIE,

97 Chambers and 81 Reade Streets, N. Y.

Hardware Manufacturer,

AND AGENT FOR

RHODE ISLAND HORSE SHOE CO.
L. COES & CO.'S GENUINE SCREW WRENCHES.
NEW LONDON HORSE NAIL CO.
WHEELER, MADDEN & CLEMSON.
WHEELER, CLEMSON & CO., FILES.
AMOSKEAG AXE CO.
TUTTLE MANUFACTUING CO.
EMPIRE MILLS TWINES.
FRENCH, SWIFT & CO.'S AUGERS & BITTS.
AUBURN TOOL CO.'S PLANES.
WINSTED HOE CO.'S PLANTERS HOES AND TOE CALKS.
WITHERBY TOOL CO.'S CHISELS, DRAWING KNIVES AND BORING MACHINES.
OHIO BUTT CO.
STEPHENS & CO.'S RULES.
FISHER & NORRIS, EAGLE ANVILS,
BOSTON BELTING CO., RUBBER GOODS.

OHIO BUTT COMPANY,

JOLIET, ILL.

MANUFACTURERS OF

CAST BUTT HINGES,

Drilled and Wire Jointed, Fast and Loose, Loose Pin Reversible, Plain, Japanned, and Japanned with Silver Acorns. Loose Joint Japanned, and Like same with Japanned or Silver Acorns.

We have appointed

HORACE DURRIE,

No. 97 Chambers St., New York,

Our only Agent in NEW YORK, BOSTON, PHILADELPHIA and BALTIMORE. for the sale of our goods, and he is authorized to sell at our lowest factory rates.

Ohio Butt Co.

L. COES & CO.,

Manufacturers of

L. COES' Genuine Improved *PATENT* SCREW

WRENCHES,

Worcester, Mass.

Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the Original Inventor of the Screw Wrench, and has, by making the bar *wider*, where the strain comes most severe, and screwing a nut up firmly against four *square* shoulders inside the ferrule, thereby *effectually* preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

There are *Imitations* of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 13th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the jaw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO"

Warehouse, 97 Chambers and 81 Reade Streets, New York.

HORACE DURRIE, Agent.

Parties ordering from the New England States can order direct from the manufacturers

L. COES & CO.,
Worcester, Mass.

EMMET HAMMER CO.,

Manufacturers of all kinds of

HAMMERS AND SLEDGES AND CONTRACTORS TOOLS,

BROOKLYN, E. D., NEW YORK.

Improved Stationary Engines.

Always on hand assortment of sizes from 10 to 200 horse power. Second-hand engines taken in exchange when desired.

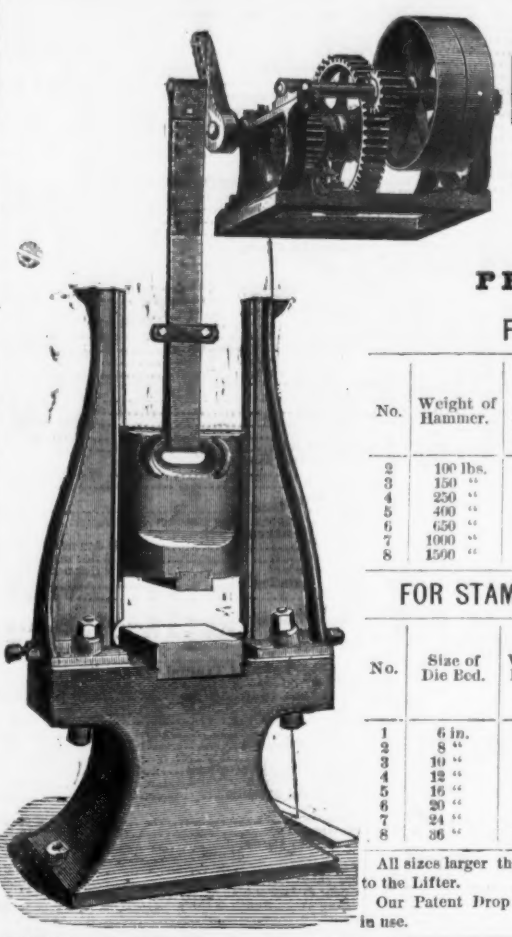
Climax Turbine Water Wheels.

Assortment of sizes always on hand.

Pulleys, Shafting, Gearing and General Machinery.

Send for Circular.

WHITEHILL, SMITH & HAMPSON,
NEWBURGH, N. Y.



Peck's Patent

Drop Press

MILO PECK & CO.

SOLE MANUFACTURERS,
NEW HAVEN, CONN

PRICE LIST.

FOR FORGING.

No.	Weight of Hammer.	Distance between Uprights.	Lift of Hammer.	Price Complete.
2	100 lbs.	8 in.	24 in.	$ 330 00
3	150 "	10 "	30 "	467 00
4	250 "	12 "	30 "	750 00
5	400 "	16 "	30 "	900 00
6	650 "	16 "	30 "	1200 00
7	1000 "	16 "	30 "	1800 00
8	1500 "	16 "	30 "	2500 00

FOR STAMPING SHEET METALS.

No.	Size of Die Bed.	Weight of Hammer.	Price of Drop without Lifter.	Price of Lifter.
1	6 in.	50 lbs.	$ 137 50	$ 82 50
2	8 "	100 "	212 50	137 50
3	10 "	150 "	300 00	220 00
4	12 "	250 "	400 00	310 00
5	16 "	400 "	550 00	430 00
6	20 "	650 "	750 00	520 00
7	24 "	1000 "	1280 00	620 00
8	36 "	1500 "	1850 00	850 00

All sizes larger than No. 3 have Wrought Iron Cranks to the Lifter.

Our Patent Drop Lifter can be applied to any Drop in use.

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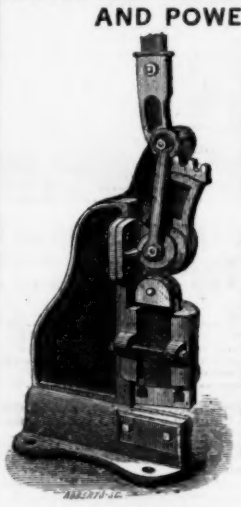

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Round Bar Hand Shear, cuts round iron, ⅛ to 1⅛ inch.....Price, $ 6 to $100

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Plate Iron Hand Shear, cuts boiler plate any width, 3-16 to ⅜.....Price, 42 to 120

Hand Punch Press, punches ⅛x⅛ to ⅝x⅝.....Price, 25 to 200

Combined Hand Punch and Round and Flat Bar Shear, punches 1-16x1-16 to ¾x⅜, cuts round iron ⅛ to ¾, cuts flat bar 2x⅜ and under.....Price, 15 to 160

Hand or Power Plate Iron Shear, cuts ⅜ boiler plate any width.....Price, 175 to 220

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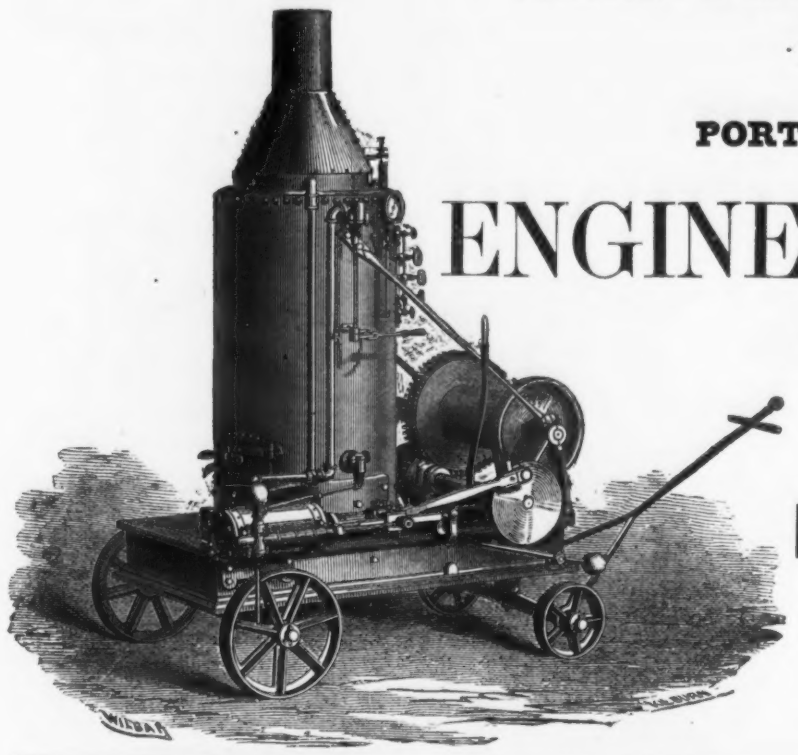

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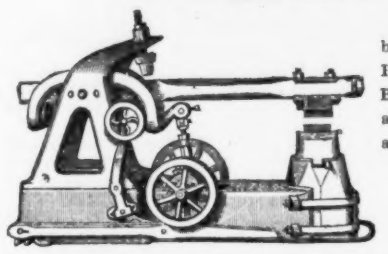

This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have *Larger Capacity, Cost Less,* are more *Durable,* take up *Less Room,* do *More* and *Better Work* at *Less Expense* for Power, than any other Hammer in use. We guarantee them fully as recommended. For particular address

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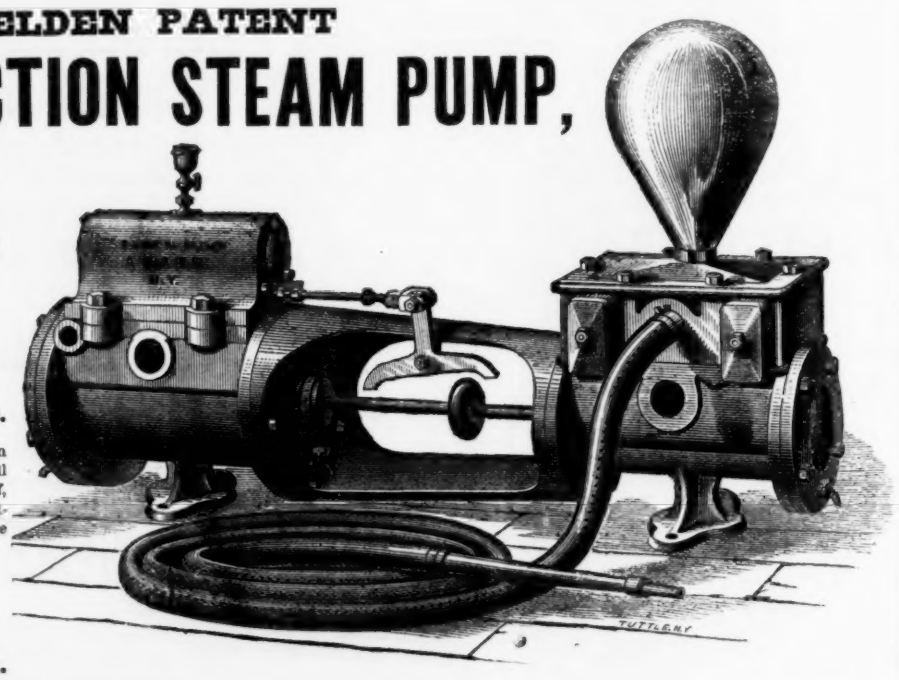

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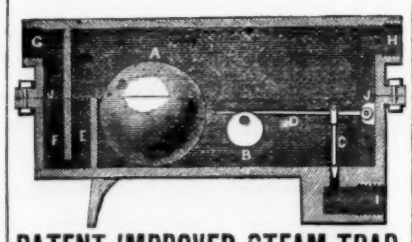

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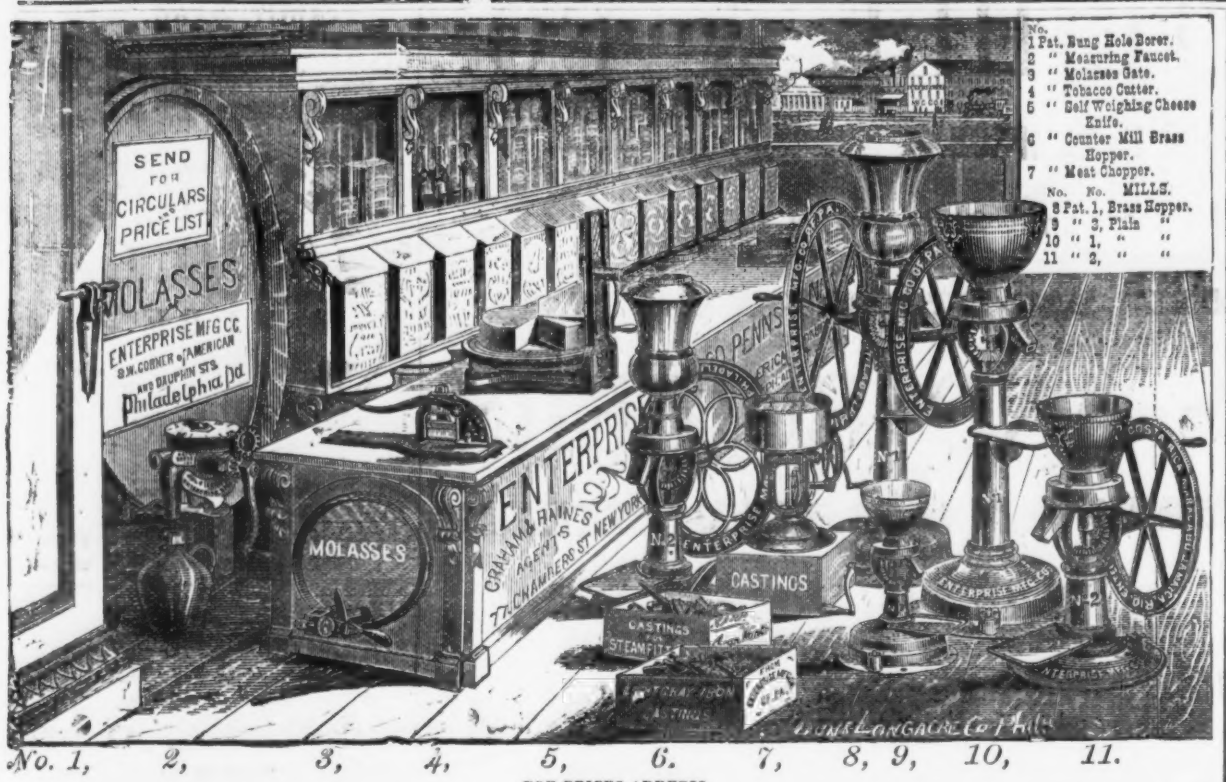
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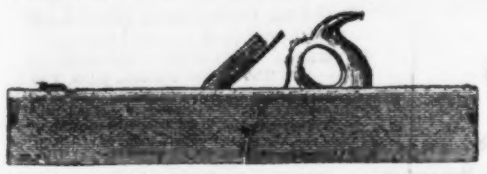

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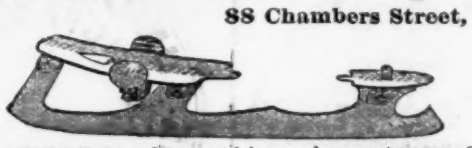

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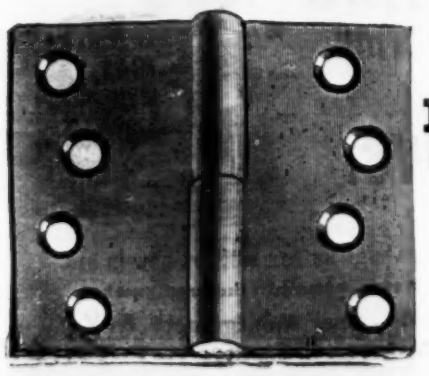

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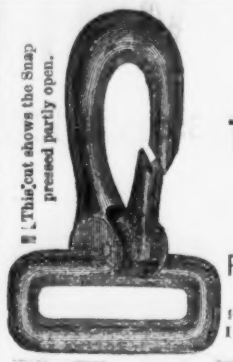

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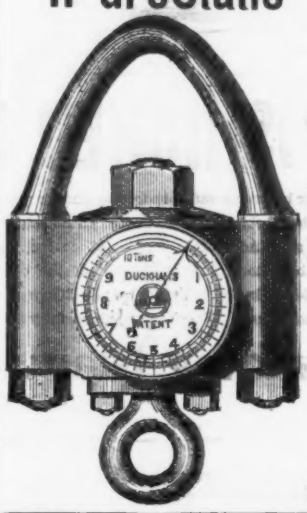
AND



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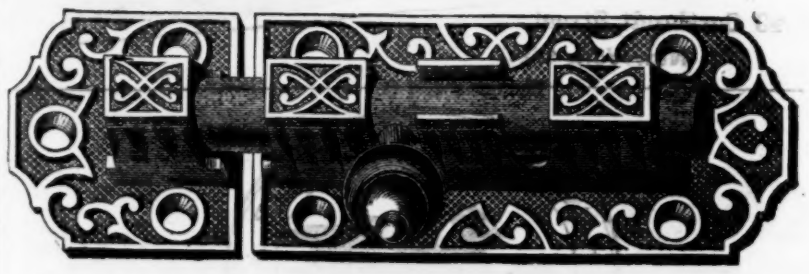

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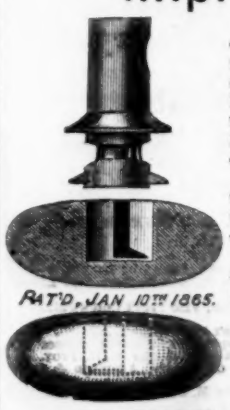

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Western " " .....dis 60&20 %
Philadelphia " " .....dis 40 %
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Wrought Loose Pin.....dis 25 %
" Table Hinges and Back Flaps.....dis 25 %
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Providence..... " 72 00
Orders for 5 dozen, discount $3 per dozen.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 20 @ 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s.....dis 60 @ 60&5 %
Concave Adjustable Handle.....dis 10 %
Beaty.....dis 10 %
Files.—Nicholson Mill Files.....new list, $5 00 to £ cur
Nicholson Bastard..... " 5 00 to £ cur
" Taper..... " 5 00 to £ cur
Butcher's Mill.....$5 75 to £ gold
" Bastard.....5 50 to £ gold
" Taper.....5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
Royal, No. 1, 4¼ inch Rollers.....list $6 00
" No. 2, 6 " " .....list 7 00
Hammers and Hatchets.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 5 %
Hinges.—Strap and T.....dis 30&7½ %
Bonney's No. 1 Gate.....dis 25 %
" No. 2 and 3.....dis 35 %
Horse Nails.

	Nos. 6	7	8	9	10
Annable	27	25	24	23	22
Globe	29	26	25	24	23
Brundage	26	24	23	22	21
	Nos. 5	6	7	8	9	10
Putnam	32	28	26	25	24	23

On Annable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door (regular manufacture).....dis 40 %
Porcelain and Mineral.....dis 40 %
Locks and Latches.—Rim and Mortise.....dis 40 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 40 %
Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....net @ dis 10 %
Mattocks.—Long and Short Cutter.....dis 15 %
Western Pattern.....dis 15 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincolnʼs " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Rakes.—Cast Steel Garden.....dis 30 %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Squares.—Steel and Iron, new list.....dis 30 %
Saws.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNiece's H'd. Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
" Back Strap " .....dis 20&10 %
Oliver Ames & Sons.....net list
Brady Shovel Co.....dis 7½ %
Sad Irons.—Reading (planed face).....per lb. 5½c.
Coquanock (polished face)..... " 6c
Stove Polish.—Gem.....₩ gross, $5 00
Onyx..... " $5 00
Scythes.—Golden Clipper.....₩ doz. $11 50
Clipper No. 10..... " 10 50
Common Scythes.....₩ doz $7 00 @ 10 00
Screws.—Iron.....new list, April 1st, 1873, dis 47½ %
Brass.....dis 50&10 %
Spoons.—Plated Spoons, Rogers Bros.'.....dis 20 @ 25 %
Britannia Spoons.....dis 35 @ 40 %
German Silver.....add to list 5 %
" Light.....dis 5 %
Try Squares.—Disston's.....dis 12½ %
Stanley Rule and Level Co.....dis 40&10 %
Willis Tyrall, No. 2.....dis 30&10 %
Willis Tyrall, No. 1.....dis 25&10 %
Tacks, &c.—Half Weight Tacks.....dis 67½ %
" " by the case.....dis 67&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " " .....dis 20&10 %
Wrenches.—Coes Genuine.....dis 30 @ 30&10 %
Coes Imitation Wrought Bar.....dis 40 %
" " Malleable Bar.....dis 30 %
" " (Kellogg) Malleable Bar.....dis 55 %
Tafts Pattern.....60 %
" " Kelloggs.....dis 60&10 %
Wire.—No. 0 to 18.....dis 30 %
No. 19 to 26.....dis 40 %
No. 27 to 36.....dis 33⅓ @ 35 %
Coppered 0 to 12.....dis 1 @ 20 %
Tinned Broom Wire.....dis 15 @ 20 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Sept. 5 1873.

Axes, Chopping—"Francis Axe Co".....$13 00 @ $14 50
Augers—C. B. Cut.....dis 30&10 %
Bits, Auger—Pierce's.....dis 25 %
Jennings'.....dis 10 %
Bells, Cow—Yaw's Genuine.....dis 30 %
Bellows—Smiths'.....dis 30 %
Bolts—Carriage and Tire.....dis 70&5 %
Braces, Bit—Barber's.....dis 40 %
Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 20 %
Cast Loose Joint.....dis 50 %
" " Pin.....dis 40&5 %
" " Japanned.....dis 40&5 %
" " Silver Tipped.....dis 25 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 25 %
" Table and Back Flaps.....dis 25 %
Wrought Butts, Loose Pin.....dis 25 %
Belting—Rubber.....dis 30 @ 33⅓ %
Leather, new list.....dis 30 @ 30&5 %
Reaters, Egg, "Peerless".....per doz $4 50
Brick—Bath (box of 2 doz) Best English.....$1 50
" Rutherford".....$1 25
Bung Borers—"Enterprise".....dis 20 %
Chalk—White, Carpenter's.....₩ gross, 60c
Red, Carpenter's " 80c
Blue, " " 90c
Crayon School " 14c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....₩ ℔ 10½c
Cherry Seeders.....per doz $12 00
Elbows—Corrugated.....5 5½ 6 7 } dis 10 %
Charcoal.....$4·25 5·25 5·25 6·50 }
Russia.....10·00 13·00 13·00 14·00 }
Files—Wheeler, Madden & Clemson's.....dis 42½ %
Freezers, Ice Cream—"Champion".....dis 33⅓ %
Gates—Molasses—
Patent Self-Measuring.....₩ doz., $42 00; dis 20 %
Hinges—Window Blind—
Clark's No. 20.....dis 50&5 %
Shepard's Standard, and Clark's.....dis 40&10 %
Garretson's " .....dis 40, 10&10 %
Wrought Strap and T.....dis 30&7½ %
Hods, Coal—Plain, Black and Galvanized.....net @ 10 %
Funnel, Black and Galvanized.....net @ 10 %
Palace Coal Vases.....net
Fancy and Helmet.....net @ 10 %
Hammers—Maydole's.....net
Yerkes & Plumb's.....dis 5 @ 10 %
Hooks and Staples—Wrought.....dis 50 %
Hooks—Belt.....dis 50 %
Hasps and staples—Wrought.....dis 60 %
Sad Irons.....₩ ℔ 5c
Kettles—Brass.....₩ ℔ 50c
Enameled.....new list dis 40 %
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns, "Peerless,".....No. 1 5 10
₩ doz $26 00 $11 25 $15 75 dis 10 %
"Radiant".....No 75 100 150 175
₩ doz $13 13 $13 13 $22 50 $22 50 dis 20 %
Tubular.....$13 00
" with Guards.....13 50
Machines—Apple Paring, "Reading".....$3 50 ₩ doz
Mills, Coffee—Box and Slide, common.....dis 15 %
Box Union and Eagle.....dis 15 %
"Enterprise".....dis 20 %
Nails—Cut, Chesapeake.....$4 50
Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Finished & Pointed.....add 1c ₩ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 7 8 9 10
22 20 19 18 17c
Packing—Rubber.....dis 30 @ 33⅓ %
Pencils, Slate—Soapstone.....4 5 6 in.
30 40 50c. ₩ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 9½c
Rivets—Iron, Black and Tinned.....dis 20 @ 25 %
Copper.....dis 10 %
Rope—Manila, ½ inch and larger.....₩ ℔ 17½c
Rules—Boxwood and Ivory, Stephens.....dis 50&10 %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 47½ %
Flat Head, Brass.....dis 60 %
Staples—Blind, Boardman's Pat., ½ & ⅝.....₩ ℔ 37½c
Skates—White's.....dis 30 %
Straps, Skate—Russet and Black.....net @ 20
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 20&5 %
Britannia.....dis 40 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₩ keg $6 50
Shovels & Spades—Shepard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 50 @ 17½ %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 67½&7½ %
Vises—Parallel, Buffalo.....dis 15 %
Wrenches—Coes' genuine.....dis 30&10 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....
Stamped and Japanned.....
Cast Iron Hollow.....dis 20 @ 25 %
Tin Plates.—Add for each X.....2·50
10x15, IC. Charcoal...$18·25 , 14x20 C. terne.....$12·25
12x12, " ... 13·75 , 20x28 C. " ... 15·75
12½x17, " ... 12·25 , 20x28 X. " ... 2·50
14x20, " ... 14·25 ,
Pig Tin—Straits.....39c @ 40
Banca.....45c @ 46
Bar Tin.....41c
Solder.....No. 1, 21½c; No. 2, 19½c
Sheet Zinc—
"Lasalle".....570 300 200 100 ℔ casks
11·00 $11·20 $11·20 $11·20 ₩ 100 ℔s
Iron Wire—Bright and Annealed.....dis 27½ %
Coppered.....dis 22½ %
Tinned.....dis 15 %
Tinned Broom, Nos. 20 21 22 .....dis 20 %
20c 21c 21c
Copper—Sheathing 14 @ 18 oz.....₩ ℔ 37c
Planished.....₩ ℔ 44 @ 46c
Bottoms.....₩ ℔ 39c
Bolts.....₩ ℔ 40c
Braziers' Sheets.....₩ ℔ 40c
Sheet Iron.—
18 Common.....$5 80
24 Common.....6 00
24 W. D. Wood & Co., Smooth Finish.....7 25
Am. Russia.....A. B.
14c 13c
Gen. Russia, No. 1 stained.....21c
" " clean.....23c
Galvanized.....dis 20 %

PITTSBURGH.

Card Rates, 60 days.

Flat Bar—
1½ to 4 x ⅜ to 1 inch..3·8c
4½ to 6 x ⅜ to 1 inch..4·0c
1¾ to 6 x 1¼ to 1½ in..4·2c
Horse Shoes.—
All sizes.....5·3c
Heavy Bands.—
3¼ to 6 x ⅜ & 5-16 in..4·4c
1¾ to 3¼ x ¼ & 5-16 in..4·5c
Light Bands.—
8 to 6 x 5-16 to No. 12..4·8c
1¼ to 2¾ x 5-16 to No. 12.....5·0c
Hoops.—2¾ to 8 in....5·1c
3¾ to 4¾ in.....5·3c
1¾ to 2 in.....5·4c
1¾ to 1 11-16 in.....5·6c
1¼ & 1¾ in.....5·9c
Round and Square.—
1 to 1¾ in.....3·8c
2 to 2¾ in.....4·1c
3 to 3¾ in.....4·3c
3¾ to 4 in.....4·8c
⅝ to 9-16 in.....4·3c
Oval Iron.—
⅝ to 1¼ in.....4·4c
⅜ to ½ in.....4·6c
Half Oval and Half Round.—
⅝ to 1¾ in.....4·1c
⅜ to ½ in.....5·4c
1¼ & 1¾ x ⅜ to ½ in.....4·0c
1 & 1¾ x ⅜ to ½ in.....4·1c
⅝, ¾ & ⅞ x ⅜ to ½ in..4·2c
Nail rods.....7·7c
⅝ to 1¾ x ¼ & 5-16 in..4·8c
⅜ to ⅞ x ¼ & 5-16 in..5·0c
1 to 1¾ x 5-16 to No. 12..5·4c
⅜ to ⅞ x 5-16 to No. 12..5·6c
1 in.....6·3c
⅞ in.....6·8c
¾ in.....7·3c
⅝ in.....7·8c
⅝ in.....8·3c
½ to 7-16.....4·5c
¾ in.....4·6c
5-16 in.....5·0c
⅜ in.....5·4c
5-16 in.....7·4c

	Bolted.	Charcoal.	Jun.
Sheet Iron, 10 to 14	5·4	6·9	8·4
" 15 to 20	5·6	7·1	8·6
" 21 to 24	5·8	7·3	8·8
" 25 to 26	6·0	7·5	9·0
" 27	6·2	7·7	9·2

All sheets over 28 in. wide, ½c. ₩ ℔ extra.

Tank Iron—
3-16, ¼ & ⅜ in. thick..5·4c
Boiler Plate Iron.....7·5c
Heads net flanging....6·7c
Railroad Iron—Counter sunk and Punched.—
1¼ x ⅜, 7-16 & ½ in ..5·2c
1¾ x ¼ & 5-16 in.....5·7c
Extras for Cutting to Length.—
Flat bars and rounds and squares.....1c
Flat bars for tire.....1c
Heavy bands.....3c
Light bands and wagon box iron.....4c
Hoops.....5c
Nails—Standard list.....$4 75

The following are the Card rates of Lewis, Oliver & Phillips:

Iron, standard list, assorted sizes, for large orders, 3·90, card rate, 2 % off net.
Iron Wedges.....5½c ₩ ℔ net
Norway Nail Rods.....9½c ₩ ℔ net
Fence Pickets—
⅝ round, bent to shape.80c ₩ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list).....60&15 % off net
Plow Bolts.....25 % off net
Stove Bolts.....at the list price
Machine and Square Head Bolts.....25 % off net
Coach and Lag Screws.....25 % off net
Bolt Ends.....20 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅝ in.....6 c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....4½c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅝ in.....7 c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅝ in.....5 c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, 1c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, 1c ₩ ℔ ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 5c ₩ ℔ net; ⅞, ¾ in. diam. 5c ₩ ℔ net; ⅝ in. diam. 5½c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 5 kegs or more, ⅝ in. diam. 8c ₩ ℔ net; 9-16 in. diam. 9c ₩ ℔; ½ in. diam. 10c ₩ ℔. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¼ to 1 in. diam. 9½c ₩ ℔ net; ⅜ in. diam. 10½c ₩ ℔ net; ½ in. diam. 12½c ₩ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 16 in. long, 7c ₩ ℔ net; 8, 10 & 12 in. long, 8½c ₩ ℔ net.
Strap and T Hinges.....30 % off net, delivered
Screw Hitching Rings.....$6 50 ₩ 100 net
Duck Nest Tuyere Irons.....$16 00 ₩ doz net
Cast Iron Washers.....₩ ℔ 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 6 ft. long.....₩ ℔ 5½c net
1 to 2 in. diam. from 4 to 6 ft. long....." 5½c net
1 to 2 in. diam. from 1½ to 4 ft. long....." 6 c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long....." 6½c net
⅞, ¾ and ⅝ in. diam. from 1½ to 4 ft. long " 6½c net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₩ set of 8 bolts.. 55c
12 " " ½ " " " 8 " .. 70c
10 " " 9-16 " " " 8 " .. } 90c
12 " " 9-16 " " " 8 " .. }
14 " " 9-16 " " " 8 " .. $1 00
10 in. long by ⅝ at Screw End, ₩ set of 8 bolts.. } 1 00
12 " " ⅝ " " " 8 " .. }
14 " " ⅝ " " " 8 " .. 1 10
16 " " ⅝ " " " 8 " .. 1 30
5c ₩ set for each additional inch over 14 in. All lengths made.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₩ set of four pieces.....88c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....60c
" " 3 " " " 65c
" " 3¼ " " " 70c
" " 3½ " " " 75c
Wagon Brake Ratchets, each.....16½c
" " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " " 2, each.....10 c
" " " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets.....dis 25 %
Wagon Box Staples, 1¼ to 2¾ in. to clinch..₩ 1000 $13 50 net
" " Box Iron, to rivet on..₩ 1000 9 50 net
Neck Yoke Eyes, each.....5½c net
" " with ⅝ rings, each.....8½c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₩ ℔ 5½c net
Wagon Rivets, ex. large, oval and steeple head, ¾ in. diam. all lengths.....10 c net
" " ⅝ in. diam. all lengths.....12 c net
" " & Nails, in 5 ℔ paper boxes....₩ ℔ 1c extra
" " " in 25 ℔ wood " " ½c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
" " " 5-16 in.....19 c net
Double Tree Plates.....
Coupling " .....} 9 c net
Tongue " .....}
Neck Yoke Plates.....12 c net
Tongue Cap Iron, 1¾, 2 & 2¾ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in. ₩ ℔ 11½c net; ¼ in., 12½c. net

WILLIAMS WHITE & CHURCHILL,
Successors to
MACKRELL & RICHARDSON MFG. COMPANY,
Manufacturers of
Builders' Hardware,
Locks, Hinges, Hooks and Staples,
Awning Hooks, Meat Hooks, Pincers,
Champion Noiseless Pulleys,
CHAIN PULLEYS, &c.
Factory, cor. Flushing and Nostrand Avenues, BROOKLYN.
Warehouse, 73 Warren St., N. Y.

TACKLE BLOCKS.
BURR & CO.
Manufacturers of Waterman and Russell's
PATENT IRON STRAPPED BLOCKS
ALSO, MANUFACTURERS OF
ROPE STRAPPED BLOCKS,
71 Pearl St., New York.

Established in 1810.
HOBART'S TACKS.
Manufactured by
Dunbar, Hobart & Whidden,
Office and Salesroom,
116 Chambers Street, N. Y.
Factory, SOUTH ABINGTON, MASS.
Manufacturers of
American, Swedes and Copper Tacks, Tinned, Leathered and Large Head Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails, HEEL and TOE PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER or JAPANNED LINING and SADDLE NAILS.
A full assortment always on hand at salesrooms, for immediate delivery if required.
Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

AMERICAN TACK Co
MANUFACTURERS OF
Copper, Swedes, and Iron Tacks.
BRUSH, LACE AND GIMP TACKS,
Leathered, Tinned, and Iron Carpet Tacks; Finishing, Black, and Tinned Trunk Nails
Hungarian and Cigar Box Nails;
COPPER and IRON BOAT NAILS
ZINC, COPPER, STEEL, and IRON SHOE NAILS
2d and 3d FINE NAILS;
Bright and Tinned Roofing Nails.
BRADS, PATENT BRADS, &c.
Factory, Fairhaven, Mass.
Salesroom, 117 Chambers Street, NEW YORK
N. B.—Any variation from the regular size or shap of the above named goods ent from sample to order.

COBB & DREW,
Plymouth, Mass.
Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk, Clout and Cigar Box Nails, &c. Rivets made to Order.
NEW YORK AGENCY
Grundy & Kenworthy,
HARDWARE.
165 Greenwich Street,
Agent for the Philadelphia Star Carriage and Tire Bolts.

SAMUEL LORING'S
PLYMOUTH TACK AND RIVET WORKS
PLYMOUTH, MASS., manufacturer of
TACKS, BRADS, NAILS AND
RIVETS.
Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 1d, 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points, &c., &c., &c., COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

GEO. W. BRUCE,
No. 1 Platt Street,
Continues to import
Nettlefold & Chamberlain's,
IRON AND BRASS SCREWS, AND WIRE GOODS, RIVETS, &c.,
and assures the trade that his stock, assortment and prices are not equaled by any other parties, whatever their pretentions. NEW YORK, April 1st, 1873.

L. A. SMITH,
NICKEL PLATER,
LICENSED BY
UNITED NICKEL CO. OF NEW YORK,
Premium Awarded by the N. J. State Fair,
42 Mechanic St., NEWARK, N. J.

Capron's Improved Turbine
WATER-WHEEL.
POLISHED & DETACHABLE BUCKETS
CHEAPEST & BEST WHEEL MADE.
CAPRON WATER WHEEL CO. HUDSON, N.Y.

A. FIELD & SONS,
TAUNTON, MASS., Manufacturers of
Copper and Iron Tacks, Tinned Tacks,
SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.
American and Swedes Iron Shoe Nails,
Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails,
Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails,
Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, etc., etc.
OFFICES AND FACTORIES AT TAUNTON, MASS.
WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.
Any variations from the regular size or shape of the above named goods made from samples, to order.

DIRECTIONS
FOR USING
L. B. Taylor's Patent Speed Indicator.

To ascertain the number of revolutions made by a shaft in any given time: Take the Indicator by the handle in the right hand, holding your watch in the left, press the point of the spindle gently against the end and center of the shaft. To every hundred revolutions of the shaft the Hundred Pointer will make one revolution, while the Thousand Pointer will indicate one number, the dial being marked into ten parts. It may be applied to a shaft revolving either to the right or left
CONN 1865 CUTLERY CO. NAUGATUCK TRADE MARK
Manufactured only by CONN. CUTLERY CO., NAUGATUCK, CONN.,
TO WHOM ALL ORDERS SHOULD BE ADDRESSED.

CROOKE & CO.,
MANUFACTURERS OF
WROUGHT IRON BUTTS,
All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.
163 & 165 Mulberry Street, New York.

Schweitzer Mfg. Co.,
57 Reade St., N. Y.
IMPORTERS & JOBBERS.

Steel.

THREE 1st CLASS PRIZE MEDALS. CLASSES 1, 21, 22, Great Exhibition of Industry, LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 1ª UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

COCKER BROTHERS,

SUCCESSORS TO

SAMʟ COCKER & SON,

(Established 1752.)

SHEFFIELD. ENGLAND

MANUFACTURERS OF

CAST, [illegible], SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
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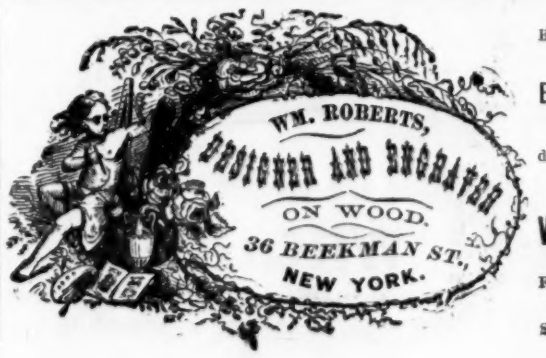

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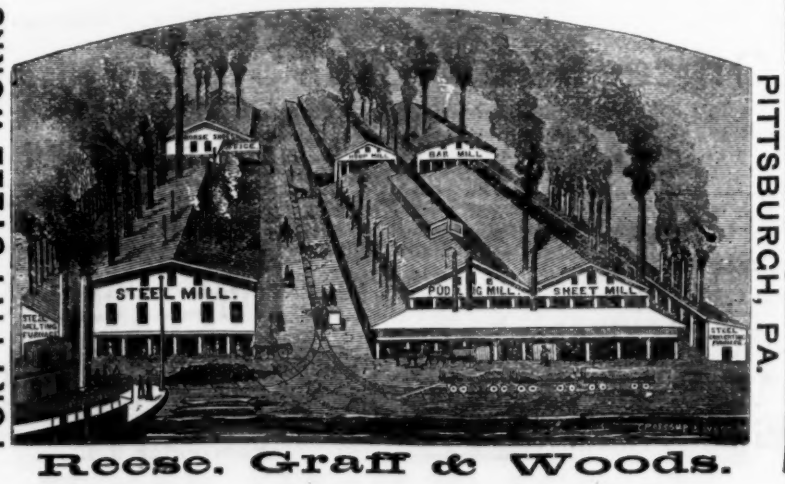

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Axes.—Forester's Favorite, Bronzed.....$13 00
Blue Jackets, Blue..... 12 50
Excelsior, Red..... 12 00
Chopper's Pride, Bronzed..... 11 00
Red Cross, Red..... 10 50
Red Cross, Handled..... 18 50
Boy's Handled Blue Jackets..... 13 00
Bells.—Hand.....dis 60&10 %
Sleigh, fancy body straps, patent leather, cloth bound, W. M., 30 bells, No. 7.....per strap $1 70
Sleigh, patent leather, cloth bound, W. M., 36 bells, No. 1.....per strap, $1 80
Sleigh, patent leather, leather bound, ex. tinned, 30 bells, No. 1.....per strap $2 38
Sleigh, patent leather, leather bound, ex. tinned, 36 bells, No. 1.....per strap $2 50
Sleigh, patent leather, leather bound, silver plated, 30 bells, No. 1.....per strap $3 38
Sleigh, patent leather, leather bound, silver plated, 36 bells, No. 1.....per strap $3 50
Sleigh, shaft straps, W. M., House, 6 bells, No. 1, ...per pair 75c
Bevels.—Star Tool Co.....dis 33⅓ %
Bits.—Auger, Griswold's.....dis 30&10 %
Auger, Jennings'.....dis 10 %
Bolts.—Carriage, Common, new list.....dis 65&10 %
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $5 25
Common, Snell's quality.....each 4 00
Breast Drills.—Miller's Falls, $30 per doz.....dis 25 %
Braces.—Barber's.....dis 40 %
Backus's.....dis 45 %
Spofford's.....dis 40 %
Butts.—Union Drilled Loose Joint.....dis 45 %
" " Wire Fast Joint.....dis 35 %
" " Acorn Loose Joint.....dis 35 %
Alden's Drilled Plain, Reversible.....dis 35 %
" " Acorn, " .....dis 25&10 %
Wrought Table Butts and Back Flaps.....dis 25 %
Wrought Narrow Butts.....dis 30 %
Castors.—Revised List.....dis 20&10 %
Chisels.—
Socket Framing M., B. & D's, warranted...dis 60&10 %
Cordage.—Manila.....₩ ℔, 17½c
American Tarred Hemp Lath Yarn.....₩ ℔, 10c
Corn Hooks.—Extra Quality, Strapped...₩ doz, $2 75
Cow Ties.—
No. 30, open ring, 3 ft., No. 6, with toggle..₩ doz $3 37
No. 35 " 3 ft., No. 6 " snap....₩ doz 3 62
No. 40 " 3½ ft., No. 5 " toggle..₩ doz 3 75
No. 45 " 3½ ft., No. 5 " snap...₩ doz 4 00
No. 50 " 4 ft., No. 4 " toggle..₩ doz 4 25
No. 55 " 4 ft., No. 4 " snap....₩ doz 4 50
No. 60 " 4½ ft., No. 3 " toggle..₩ doz 4 50
No. 65 " 4½ ft., No. 3 " snap....₩ doz 4 75
Crow Bars.—Iron, Steel Points.....₩ ℔, 6½c
Enam. Ware.—Kettles.....dis 25 %
Files.—Emil Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 10 %
Nicholson.....$5 to £ currency, less 7½ %
Funnel Irons.—$2·50 $2·50 $2·50 $3·25 per doz
5, 5½, 6, 7 inch
Deep Flange, $3·50 $3·75 $4·00 per doz
5, 5½, 6 inch
Gauges.—Star Tool Co.....dis 33⅓ %
Hammers.—Maydole.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $8·75
" " " " bell face, No. 1, $11; 1½, $9·75.
Hangers & Rollers.—Novelty.....dis 30 %
Hatchets.—Underhill Edge Tool Co.....dis 10 %
Underhill pattern, solid, C. S. lathing.....$9 50
Hinges.—Strap and T, Stanley Works.....dis 30&7½ %
Plate, Loose, and Fast Joint.....₩ ℔, 8c
Wrought Screw Hook.....₩ ℔ 8c
Locks.—P. & F. Corbin.....dis 40 %
No. 498, Iron Face and Bolts, Mortise, 3½ inch, per doz net.....$1 88
No. 1000, reversible rim knob.....$2 25
Mattocks.—K. P. & Co., axe finish, long cutter..$13 75
Short cutter..... 13 50
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₩ ℔
Nails.—10d and larger.....$4 75
Paper.—Finest Quality Manila.....₩ ℔ 11c
Pevers.—Reading, New Pattern.....per doz $8 00
Turn Table.....per doz 8 50
Picks.—K. P. & Co., Polished Points—
5 to 6.....per doz $10 00; 6 to 7, $10 50
Pulleys.—Clark & Co.'s Axle, 1¼ in.—
.....per doz 37c.; 2 in., 42c
No. 115, Axle, 1¾ in.....per doz 37c
Plated Ware.—Rogers Bros.:—
Under $200.....dis 20 %
Over $200.....dis 20&5 %
Pocket Knives.—Conn. Cutlery Co.....new net list
Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₩ ℔ net
Rules.—Stephens & Co.....dis 60 %
Saws.—Disston's.....dis 12½ %
Lightning X cut, Boynton's.....per foot 7c
" Saw Blades, 32 inch.....per doz $7 00
" Framed Saws.....per doz $10 00
Common " " .....per doz 6 00
Disston " " .....per doz 9 00
One man X cut.—Lightning.....per foot 8½c
Disston's $3·00 each.....dis 12½ %
Screws.—American Screw Co.....dis 47½ %
Shovels.—O. Ames.....dis 2½ %
M. B. & D.....dis 5 %
Sinks.—Cast Iron, 2, 2½, 3, 3½, 4, 4½ feet.
$1·37 $1·62 $2·25 $2·75 $3·75 $4·75 each.
Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12·00 per doz.....dis 15 %
Traps.—Oneida.....dis 20 %
Blake's.....dis 20&5 %
Try Squares.—Star Tool Co.....dis 33⅓ %
Vises.—K. P. & Co.'s Solid Box, Blacksmith...₩ ℔ 15½c
Parker's Parallel.....dis 5 %
Backus.....dis 25 %
Weights.—Window Weights.....₩ ℔ 2½c
Wrenches.—Coe's Genuine Wrenches.....dis 40 %
Wringers.—
Novelty and Universal, Tub No. 2, less than 5 doz., ₩ doz $ 72 00
5 doz., ₩ doz 69 00
10 doz., ₩ doz 67 00
Novelty Bench, No. 4, less than 5 doz., ₩ doz 108 00
5 doz., ₩ doz 104 00
10 doz., ₩ doz 101 00
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I. C. Charcoal	@ 13 50	" Terne	11 50 @ 13 00
Pig Tin.—	₩ ℔	Straits, gold	32c
Banca, gold	37c	English "	32c
Copper.—	₩ ℔	Braziers	40c
Sheathing	33c	Ingot	28c
" Yellow	c	Old	26c
Bolt	40c	Sheet and Pipe	9·45c
Lead.—	₩ ℔	Old	6¾c
Spanish Pig, gold	6¾c	American, gold	1c
Spelter.	₩ ℔		
Silesian, gold	8c		
Zinc.—Sheet			₩ ℔ 10¾c
Iron.—Sheet Iron, Russia, gold			₩ ℔ 18c
Sheet Iron, English			" 7c
" " American			" 7¼c
" " Galvanized			" 11c @ 13c
Swedes Bar Iron, Flat, gold			₩ ton, $145 00 @ $155 00
" Shoe Shapes, gold			155 00 @
Norway Bar Iron, Flats, gold			145 00 @ 152 00
" Shapes, gold			155 00 @
" Round, 2 in. to ⅜ in., gold			147 50 @ 152 50
" " 11-16 to ½ in. "			162 50 @
" " 5-16 to ⅜ in. "			165 00 @
" Nail Rods, Rolled			177 50 @
" " U. B.			172 50 @
" " Benzon			167 50 @
" " Vasa			160 00 @
" " N J W "			160 00 @
English Refined Bar Iron			87 50 @
Scotch Pig Iron			40 00 @ 45 00
American "			38 00 @ 48 00
Wrought Scrap Iron			45 00 @
Steel.—	₩ ℔	German	11c
Eng. Tool, gold	16c	Spring	9c
" Mach. "	10c	Tire	8c
American Tool	16c	Sleigh Shoe	8¼c
" Mach	11c	Toe Calk	8¼c
Bessemer	8¼c@9½c		

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Anvils.—Armitage.....₩ ℔, gold, 15c
Peter Wright's..... " 14½c
Wilkinson's..... " 12½c
Apple Parers.—Conqueror.....₩ doz, $9 00
Lightning..... " 9 00
Turn Table..... " 9 00
Augers and Bits.—Cook's.....dis 25 %
Ives'.....dis 20 %
Jennings'.....dis 5 %
Snell's.....dis 12½ %
Axes.—Hunt's.....₩ doz $14 50 @ 15 50
Lippincott's..... " 14 00 @ 15 00
Lippincott's Pioneer..... " 14 50 @ 15 50
Shinmons'..... " 13 50 @ 14 50
Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.....dis 10 %
Swelled Taper Axles.....dis 10 %
Concord Axles.....dis 10 %
Red Jacket Axles.....dis 10 %
Common Axles, 1¼ inch and upward.....₩ ℔, 8¼c
" " less than 1¼ inch..... " 9¼c
Bells.—Troy, Church.....₩ ℔, 50c
Light Brass, Hand.....dis 50 %
Moore's, Cow.....dis 10 %
Bolts.—Arms, Bell & Co.'s Machine.....dis 10 %
Arms, Bell & Co.'s Carriage and Tire.....dis 60& 20%
Norway Iron Carriage and Tire.....dis 40 %
Cast Iron Barrel, Shutter, &c.....dis 25 %
Cast Butt Hinges.—Narrow Fast Joint.....dis 25 %
Broad Fast Joint.....dis 40 %
" Loose " .....dis 50 %
Reversible.....dis 45 %
" Japanned and Silver Tipped.....dis 40 %
Loose Joint "Acorn" " " .....dis 40 %
Excelsior Reversible Blind.....dis 30&10 %
Lull & Porter's Blind.....dis 35 %
Wrought Butts.—Narrow.....dis 20 %
Reversible.....dis 25 %
Broad.....dis 25 %
Table Hinges.....net list
Back Flaps.....net list
Inside Blind Hinges.....net list
Casters.—Porcel'n Wheel Bed or Plate...rev. list dis 15 %
Iron or Brass Wheel Bed or Plate.....
Chain.—Eng. Coil..5-16 ⅜ 5-16 ⅜ 7-16 ½ in.
14 11¾ 10¾ 10 9¼ 9c gold
Trace.....6¼-10-2 75c "
7-10-2 80c "
German Coil and Halter.....new list add 25 % "
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Size, inches..... ⅜ 7-16 ½ 9-16 ⅝
Price cents ₩ ℔..... 12¾ 12¾ 10½ 10 9½ net
Size, inches..... 11-16 ⅝ 13-16 ¾ 15-16
Price, cents ₩ ℔..... 9½ 8¾ 8⅝ 8¼ 8⅝ net
Size, inches..... 1 1-16 1¼ 1 3-16 1¼
Price, cents ₩ ℔..... 8¼ 8¼ 8 7¾ 7¾ net
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Chisels.—Socket, Firmer or Framing.....dis 55 %
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Novelty..... " 72 00
Universal..... " 72 00
Monitor..... " 72 00
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P. S. W. & Co.'s.....net
Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₩ doz $5 75
Disston's..... " 6 00
Crow Bars.—Steel Pointed.....₩ ℔ 8 @ 10c
Solid Cast Steel..... " 20c
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Auburn Mfg. Co.'s Hay and Manure Forks.....dis 25 %
" " Handled Hoes.....dis 20 %
" " Planter Eye Hoes.....add 20 %
Winsted's Planter Eye Hoes.....add 20 %
Hammers.—Yerkes & Plumb.....new list net
Masons' Hammers.....₩ ℔ 20c
Smith Hand Hammers..... " 22c
Handles.—Axe.....Extra. No. 1. No. 2. No. 3.
" $2·75 $2·25 $1·75 $1·00
Pick.....Extra. No. 1. No. 1½. No. 2.
$2·50 $2·00 $1·75 $1·25
Smith & Montross Fork, Hoe and Rake.....dis 10 %
" " Broom and Mop.....$12 @ $18 ₩ M.
Harrow Teeth.—1 inch iron.....₩ ℔ 5½c
⅞ and ¾ inch iron..... " 5¾c
⅝ inch iron..... " 5¾c
Barbed or Headed.....½c extra
Hatchets.—Hunt's.....net list
Simmons'.....dis 5 %
Hay Knives.—Lightning.....₩ doz $22 00
Dunn Edge Tool Co.'s.....₩ doz $14 50—dis 15 %
Fisher's..... " 16 50—dis 10 %
Hinges.—Strap and T—St. Louis make.....dis 25 %
Horse Nails.—Eureka.....23c rates
Ausable.....22c "
Northwestern.....22c "
Eagle.....19c "
National Patent Pointed.....21c "
" " " Extra Finished.....22c "
Horse Shoes.—R. I. (Perkin's pat.).....₩ keg $7 00
Burden's..... " 7 00
Mule Shoes.....$1 00 extra
Rhode Island Trotting Shoes..... 2 50 "
Locks and Latches.—
Jones & Nimick's.....revised list dis 40 %
Moorhead, Adams & Co.....dis 40 %
Norwalk Lock Co.'s revised list.....dis 25 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks...₩ doz. $15 00 @ 16 00
" Grub Hoes, Oval Eye...₩ doz. 12 00 @ 13 00
Nails.—Wheeling.....$4 75 rates.
Orders for 100 kegs 10c ₩ keg less.
Picks.—Klein, Logan & Co.'s R. R. and Clay ₩ doz.$12 00
Klein, Logan & Co.'s Coal..... " 9 75
" " Poll..... " 12 00
" " Stone..... " 16 50
" " Tamping..... " 19 00
Planes.—Ohio Tool Co.'s.....dis 10 %
Eastern.....dis 20 %
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 20 %
Barton's Patent.....₩ doz $25—dis 20 %
Vaughn's " ..... " 25—dis 10 %
Sad Irons.—Monitor Brand, Silver Polished...₩ ℔ 6c
Sash Weights.—Standard Solid Eyes.....₩ ℔ 3½c
Saws.—Disston's.....dis 10 %
Spear & Jackson's.....$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 10 %
Livingston's Patent Buck.....net list
Screws.—American Screw Co.'s revised list...dis 45 %
$2000 worth in 6 months.....2½ % extra
Scythes.—Blood's C. S. & G. S.....net list
Dunn Edge Tool Co.'s, Factory List.....dis 15 %
Paris Furnace Co.'s.....dis 25 %
Waldron's English.....$10 00 to £
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond..... " 7 50
Premium..... " 9 50 dis 25 %
Diamond Grit..... " 13 50
Shovels, Spades and Scoops.—Ames'..add $1 to list
Lippincott's.....new list net
Rowland's, Maxwell.....revised list net
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ ℔, 17c
Solid Cast Steel..... " 35c
Striking Sledges.....₩ ℔ extra, 1c
Snaths and Cradles......dis 20 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 5 %
Blue Seat Springs.....new list dis 10 %
Tacks.—Norway Tack Co.'s ½ weight.....dis 67½ %
Brads.....dis 50 %
Traps.—Newhouse Patent.....dis 15 %
Reichard's Animal, Wood Bottom.....₩ doz $10 00
" " Metal Bottom..... " 12 00
Vises.—Solid Box.....₩ ℔ 18c
Wilson Mfg. Co.'s.....dis 15 %
Wrenches.—Coes' Genuine.....dis 30 %
Coes' Pattern.....dis 40 %
Taft's.....dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Charcoal	$14 00	IX, 20x28, Terne	$22 00
IX, 10x14, "	17 00	IC, continuous, 20 in. x 200 ft.	26 00
IC, 12x12, "	14 50	IX, continuous, 20 in. x 200 ft.	34 00
IX, 12x12, "	17 50	IC, 10x14, best Coke	13 50
IC, 14x20, "	15 00	IC, 10x14, good "	13 00
IX, 14x20, "	18 00	IC, 10x20	20 00
IC, 14x20, Terne	13 50	IC, 14x20	13 50
IX, 14x20, "	15 50		
IC, 20x28, "	27 00		

Block Tin.

Large Pigs	42c	Bars	44c
Small "	45c		

Sheet Zinc.

Casks	₩ ℔ 11c	Sheet	₩ ℔ 11¼c

Solder.

No. 1, Refined, in bars or plate	22c
No. 2, " " "	21c
Pig Lead	8c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....40c
14 to 16 lbs., Sheets 30x60.....42c
10 to 12 lbs. " and 20x72.....45c
6 to 9 lbs.. " 48c
Tinned, 14 and 16 oz. 14x48.....38c
Planished, 14 and 16 oz. 14x48.....46c
" No. 7, 8 and 9.....48c
Copper Bottoms.....40c

Sheet Iron.—

	Com'n.	Sm'th.	Char'l.	Jun.
No. 16 to 20	6¼c	7¼c	8¼c	
No. 22 to 24	6¼c	7¼c	8¼c	
No. 26	6½c	7½c	9c	11¼c
No. 27	6¾c	7¾c	9¼c	11¾c

Galvanized Iron.....dis 25 %
Iron Rivets.....dis 15@20 %
Iron Wire.....dis 25 %
Coppered Nail Rod Wire.....dis 10 %
Copper Rivets and Burs.....dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₩ ℔.....22c
No. 1, stained, ₩ ℔..... 22c
Imitation Russia, ₩ ℔..... 15c

CHICAGO.

(Reported by Cragin Bros. & Co., 141, 143, and 145 Lake St.)

Tin Plate.—

IC, 20x14, Coke	$13 00	IXX, 14x20, Charcoal	21 00
IC, 10x14, Charcoal	14 00	IXXX, 14x20, "	24 00
IX, 10x14, "	17 00	IXXXX, 14x20, "	27 00
IC, 12x12, "	14 50	IX, 14x14, "	28 50
IX, 12x12, "	17 50	DC, 100 Plate, "	14 50
IC, 14x20, "	15 00	DX, "	17 00
IX, 14x20, "	18 00	DXX, "	20 00
IC, 14x20, Coke Roofing		DXXX, "	23 00
IC, 10x20 Coke, for Gutters			21 00
IC, 14x20, Charcoal Roofing			13 50
IX, 14x20, "			15 50
IC, 20x28, "			27 50
IX, 20x28, "			31 50

Pig Tin.—	
Large, 60 ℔	42c
Small, 30 ℔	43
Bar Tin	46c
Zinc.—	
In casks 1000 ℔ s	11 c
" 500 "	11¼c
In sheets	11½c
Slab	9c
Copper.—Copper Bottoms	40c
Sheathing Copper	38c
Planished Copper, 14x48	46c
Size, 14x52, 14x56, 14x60 Nos. 7 8 9	Planished Copper 48c
Braziers' Sheets, 30x 60.—6 to 8 lbs	46 c
10 and 12 lbs	43c
15 to 100 lbs	40c
Ingot Copper	
Bolt "	43c
Solder.—Extra Fine, C. B. & Co.'s Brand	38c
Fine, No. 1	23c
Ordinary, No. 2	21 c
Plumbers' Solder	23c
Braz'rs' or Spelt'r Solder	38c
Antimony	20c
Babbit Metal	15c @ 25c.
Galvanized Iron Conductor Pipe	₩ ℔ 10c

Sheet Iron.—

	Common.	Smooth.	Charcoal.
No. 14 to 21	6¼c	7¼c	8¾c
25 & 26	6¼c	7¾c	9 c
27	6¾c	7¾c	9¼c

Add ¼c ₩ ℔ for 30 in. wide.

Galvanized Iron			dis 25 %
No. 16 to 20	15c	No. 27	18c
21 to 24	16c	28	20c
25 & 26	17c		
Russia Iron.—		No. 18	c
Perfect, 8, 9 and 10	23c	In Sheets, 1c. higher.	
" 11 and 12	22c		
American Russia.—		B	14c
A	15c	In sheets, 1c higher.	
Lead.—		Lead Pipe, in full coils	10½c
Pig	8½c	Lead Pipe, when cut	
Bar	10c	Sheet Lead	10½c

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal		**Copper.**—	
IC, 10x14	$12 75	Sheathing	37½c
IX, 10x14	15 50	Copper Bottoms	39½c
XX, 10x14	18 25	**Planished Copper.**—	
IC, 12x12	13 25	Sheathing, 14x48	46c
IX, 12x12	16 00	Boiler Size, No. 7	48c
IC, 14x20	15 75	" " No. 8	48c
IX, 14x20	16 50	" " No. 9	48c
XX, 14x20	19 25	**Pig Tin.**—	
XXX, 14x20	22 00	Large Pigs	39c
XXXX, 14x20	24 75	Small Pigs	40c
DC, 100 Plate	14 25	Bars	41c
DX, "	15 00	**Solder.**—No. 1	21½c
DXX, "	17 75	No. 2	19½c
DXXX "	20 50	**Bright Wire**	dis 27½ %
DXXXX 100 Plate	27 25	**Sheet Iron.**—	
IX, 14x14	26 00	No. 18 Am. Com	6
IC, 10x14 W	12 25	No. 24 Am. Com	6
IX, 10x14 W	15 00	Pat. Am. Russia "A," Nos. 24, 25 & 26	14c
Coke Tin.—		Russia No. 9, 10, 11&12, 21½c	
IC, 10x14 Coke	$10 75	W. D. WOOD'S & CO.'S SHEET IRON.—	
IX, 10x14, Coke	13 50	Nos. 15 to 20 Smooth	$7 15
IC, 14x20, "	12 75	" 21 to 24	7 55
		" 25 & 26	7 75
		21 to 24 Char'l	8 85
		25 & 26 "	9 05
Sheet Zinc.—Any width			10½c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal			$14 00 @ $15 00
I. C. 10x14 best Coke			13 00 @ 14 00
I. C. Terne, 14x20			14 50 @ 13 50
I. C. " 20x28			26 00 @ 28 00
I. C. Continuous			28 00
Pig Tin.—		Straits	₩ ℔ 45c
Banca	₩ ℔ 47c	English	42c @ 43c
Solder.—		A 1	₩ ℔ 25c
S. & Co.	₩ ℔ 28c	Roofing	" 24c
Lead.—Pig	₩ ℔ 7¾c @ 8c.	Bar	₩ ℔ 8c @ 9c
Copper.—			
Ingot	₩ ℔ 31c @ 33c	Brazier, 6 to 9 lb	₩ ℔ 45c
Planished	" 51c @ 53c	" 10 to 14 lb	" 42c
Sheathing	" 44c @ 46c	" 14 to 100 lb	" 40c
Bolt	" 40c	Copper Bottoms	" 45c
Zinc.—Cask, 500 to 1000 lbs			₩ ℔ 11½c
Case, 100 lbs			" 11¾c
Slab			" 8¾c @ 9c
Brass.—		Roll, No. 38 to 40	₩ ℔ 50c
Roll, No. 6 to 30	₩ ℔ 45c	Wire, No. 0 to 20	₩ ℔ 50c
" 30 to 38	" 65c	" 20 to 25	" 60c
Babbit Metal.—		Black Lead	₩ ℔ 25c
Sellew & Co.	₩ ℔ 55c	Market	" 15c
Antimony			₩ ℔ 22c
Bismuth			₩ ℔ 46 0
Nickel			₩ ℔ 43 5

Sheet Iron.—

Russia	₩ ℔ 20c @ 22c	Am Russia A	₩ ℔ 14 @ 15c
		" B	" 13 @ 14c

	Com. B.	Smooth Fin. S. I. U.	Smooth D Re'fd.
15 to 20	6·0c	7·5c	9·1c
22 to 24	6·2c	7·8c	9·2c
26	6·4c	8·0c	9·4c
27	6·6c	8·2c	9·6c

Galvanized Iron.—Full bundles.....dis 20 %
Nos. 18 to 20.....15c | No. 27.....18c
22 to 24.....16c | 28.....20c
25 to 26.....17c
Bar Steel.—Sliver, ₩ ℔ 21c; Crescent, 17½c.
Iron Wire.....dis 15 %
Enameled Ware.....dis 33⅓ %
One Piece Corrugated Elbows.—

Charcoal Iron.		Russia Iron.	
4½ inch	₩ doz $3·75	4½ inch	₩ doz $3·00
5 "	" 4·25	5 "	" 10·00
5½ "	" 5·25	5½ "	" 13·00
6 "	" 5·25	6 "	" 13·00
7 "	" 6·50	7 "	" 14·00

Leader Elbows—Flat Crimp Retinued.—

	₩ doz.		₩ doz
2-inch	$2 00	2½-inch	$2 25
3-inch	2 50	3½-inch	3 00
4-inch	3 50	4½-inch	4 00

Sheet Iron Bread Pans.....₩ ℔ 18c
American Broilers.....₩ doz, $3·50
Tinmen's Machines.....Net list
Sad Irons.....₩ ℔, 5½c
Brass Kettles.—Ansonia.....48c

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—₩ ton.						
Best Selected	95	0	0	96	0	0
Tough Cake & Tile	93	0	0	94	0	0
Sheathing and Sheets	99	0	0	100	0	0
Bolts	100	0	0	—	—	—
Bottoms	100	0	0	103	0	0
Old (Exchange)	85	0	0	—	—	—
Burra Burra	92	0	0	12	10	0
Wire	₩ ℔. 0	1	0¾	—	—	—
Tubes	" 0	1	0¾	0	1	1
Brass—₩ ℔.						
Sheets	0	0	10	0	0	11
Wire	0	0	10¾	—	—	—
Tubes	0	0	11¾	0	0	11¾
Yellow Metal Sheathing	0	0	8¾	0	0	9
Sheets	0	0	8¾	0	0	8¾
Tin—₩ ton.						
English Blocks	127	0	0	128	0	0
Ditto Bars	128	0	0	129	0	0
Ditto Refined	130	0	0	—	—	—
Banca	130	0	0	131	0	0
Straits	128	0	0	129	0	0
*** Tin Plates**—† ₩ box.						
IC Charcoal	1 qual.	2	0	0	2	3	0
IX "	1 qual.	2	6	0	2	9	0
IC "	2 qual.	1	18	0	2	0	0
IX "	2 qual.	2	3	0	2	6	0
IC Coke		1	12	0	1	16	0
IX "		1	18	0	2	2	0
Canada Plates

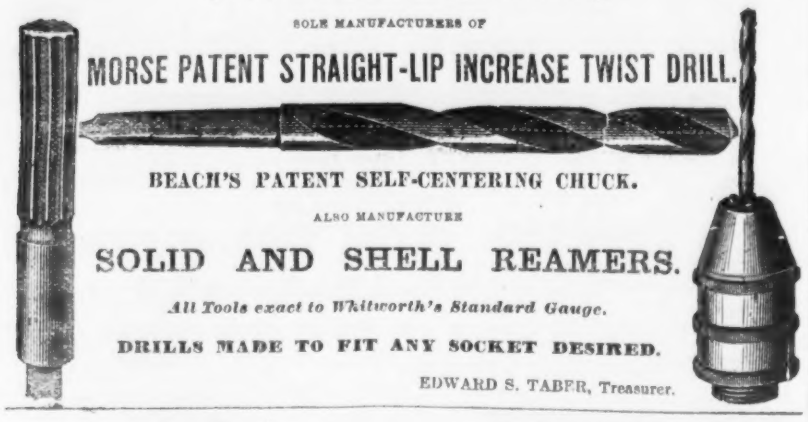
Machinery, &c.

Morse Twist Drill and Machine Company,

New Bedford, Mass.,

SOLE MANUFACTURERS OF

MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.



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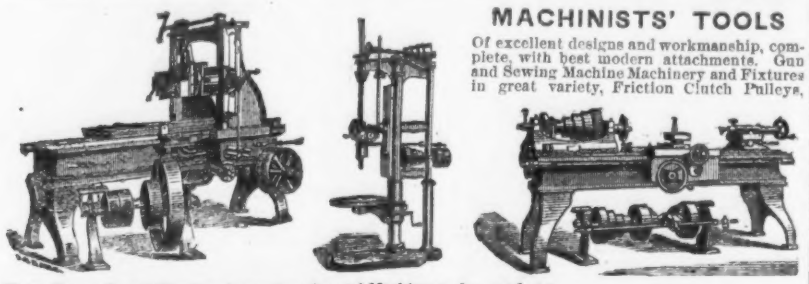

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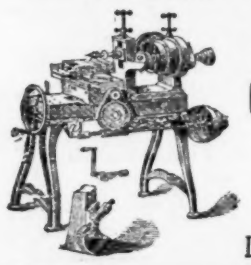

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ADJUSTABLE SELF-OILING HANGER.

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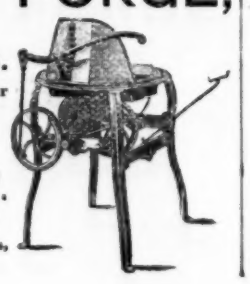

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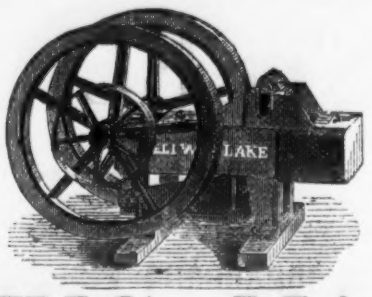

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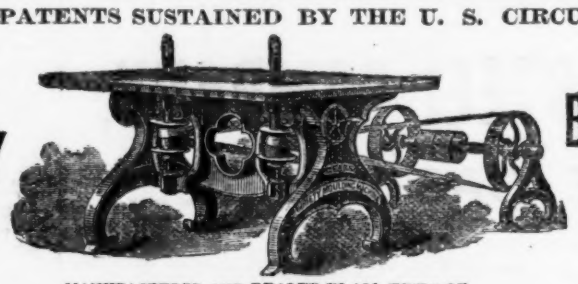

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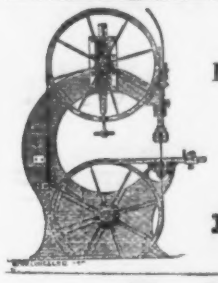

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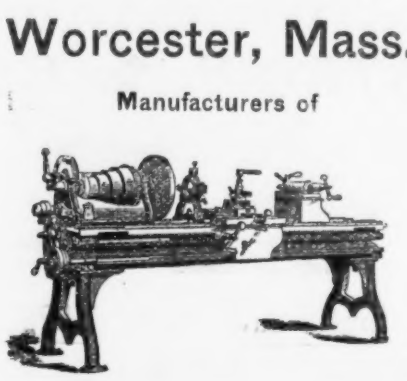
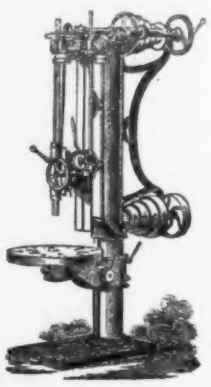
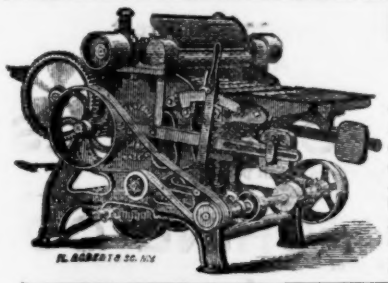




Engine Lathes & Drill Presses.



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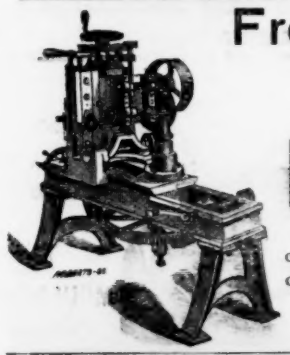

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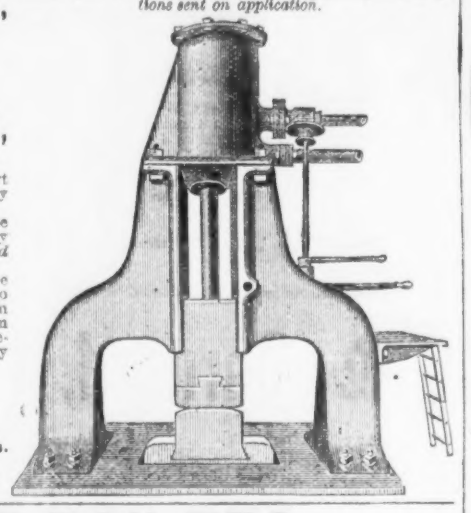

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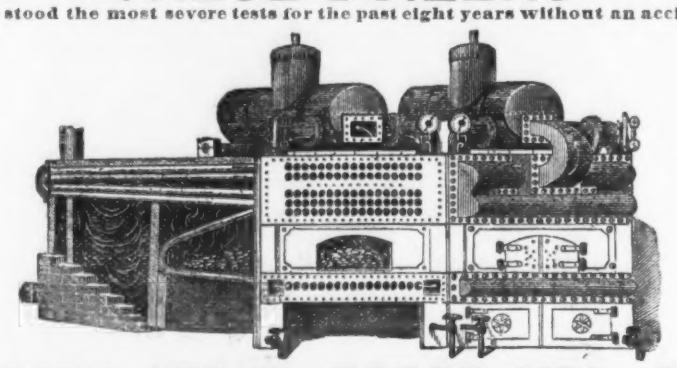

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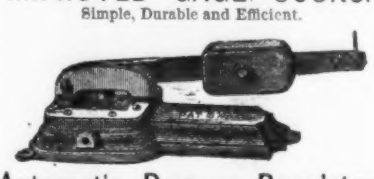

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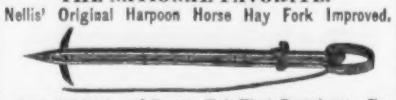

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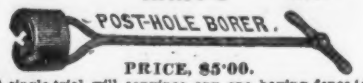

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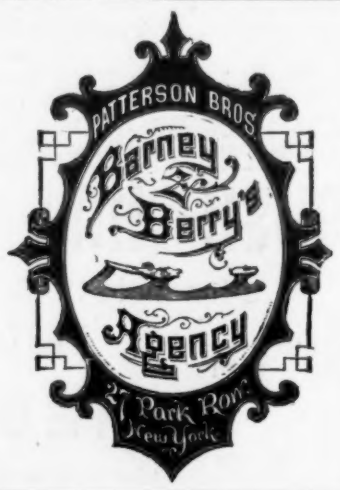

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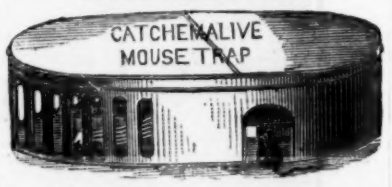

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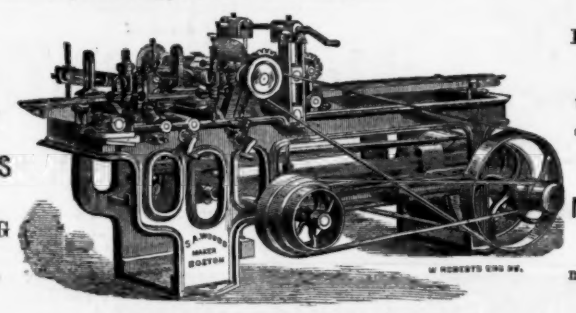

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